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# COMMERCIAL FISHERIES REVIEW

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ALBERT M. DAY, Director

# COMMERCIAL FISHERIES REVIEW

A REVIEW OF DEVELOPMENTS AND NEWS OF THE FISHERY INDUSTRIES
PREPARED IN THE BRANCH OF COMMERCIAL FISHERIES

A. W. Anderson, Editor
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Wm. H. Dumont and J. Pileggi, Assistant Editors

**Applications for COMMERCIAL FISHERIES REVIEW, which is mailed free to members of the fishery industries and allied interests, should be addressed to the Director, Fish and Wildlife Service, United States Department of the Interior, Washington, 25, D.C.**

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# COMMERCIAL FISHERIES REVIEW

June 1948 Washington 25, D.C. Vol.10, No.6

## KITE RIGS FOR OTTER TRAWL GEAR[1/]

By R. T. Whiteleather*

Various types of balloon trawls have been developed for use in the United States fisheries, but little attention has been given the use of kites in expanding the vertical fishing range of otter trawls. Otter trawls rigged with kites have been a common type of gear in many of the European fisheries for some time, and are used principally in catching herring and mackerel. This modification of otter trawl gear might well be of advantage in our domestic fisheries where there are fish frequently found just off the bottom at a distance where they escape the regular "flat" trawl or even the so-called balloon trawl.

The gear as used in the European fisheries is generally rigged in one of three ways, as shown in Figure 2, Single Kite Rig; or Figure 3, Single Kite with Danleno, or Figure 4, Double Kite with Danleno. As may be seen in Figure 2, the method by which the net is connected to the otter boards is by means of wire ropes which are continuations of the headrope and groundrope, respectively. No danlenos or ground cable (sweep) are used in this method of attachment of the otter boards to the net. This set-up is generally used when the gear is being fished for herring and mackerel only, and groundfish are not being sought.

It is difficult to give specific dimensions on the lengths of the kite-towing wires and the kite-tail wires since there will be small variations in accordance with the particular design of net being used. As an ordinary rule, the length of the kite-towing lines can be calculated by taking half the length of the headrope plus the length of the legs, and subtracting the length of the kite-tail lines. As an example, in Figure 2, one-half the headrope is 50 feet, add the length of the legs, 30 feet, and subtract 6 feet for the length of the kite-tail wires, and the sum equals 74 feet for the kite-towing wire. The towing wires are usually 1-inch, 6 x 12, flexible steel wire. It must be emphasized that this is only a general rule for measurement of length and that any fisherman can make alterations in the light of his experience in operating the gear.

Figure 3 shows the customary rig embodying the use of ground cables or sweeps of varying lengths. Danlenos are connected to the net by means of legs approximately 10 feet in length. The calculation for determination of the length of the kite wires is the same as mentioned in the rig in Figure 2.

Figure 4 shows the use of the first kite as in Figure 3 with the introduction of a second kite, or upper kite, towed from the otter boards. This method of rigging kites is not as generally used as a single kite rig, but is the specialty of the Dutch herring trawling fleet in the North Sea. It is the thought of some fishermen that the upper kite riding a considerable distance above the trawl has a tendency not only to keep the trawl fully opened, but also to frighten the fish downward, sending them toward the bottom where they will be in the path of the trawl.

Kites are made in a variety of sizes, but the one illustrated in Figure 1 is very near standard dimensions. It is reinforced with battens on the back, as

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1/Prepared from information furnished by H. M. Binns of The Great Grimsby Coal, Salt, and Tanning Company, Grimsby, England.

NOTE: Available also as Fishery Leaflet 302.

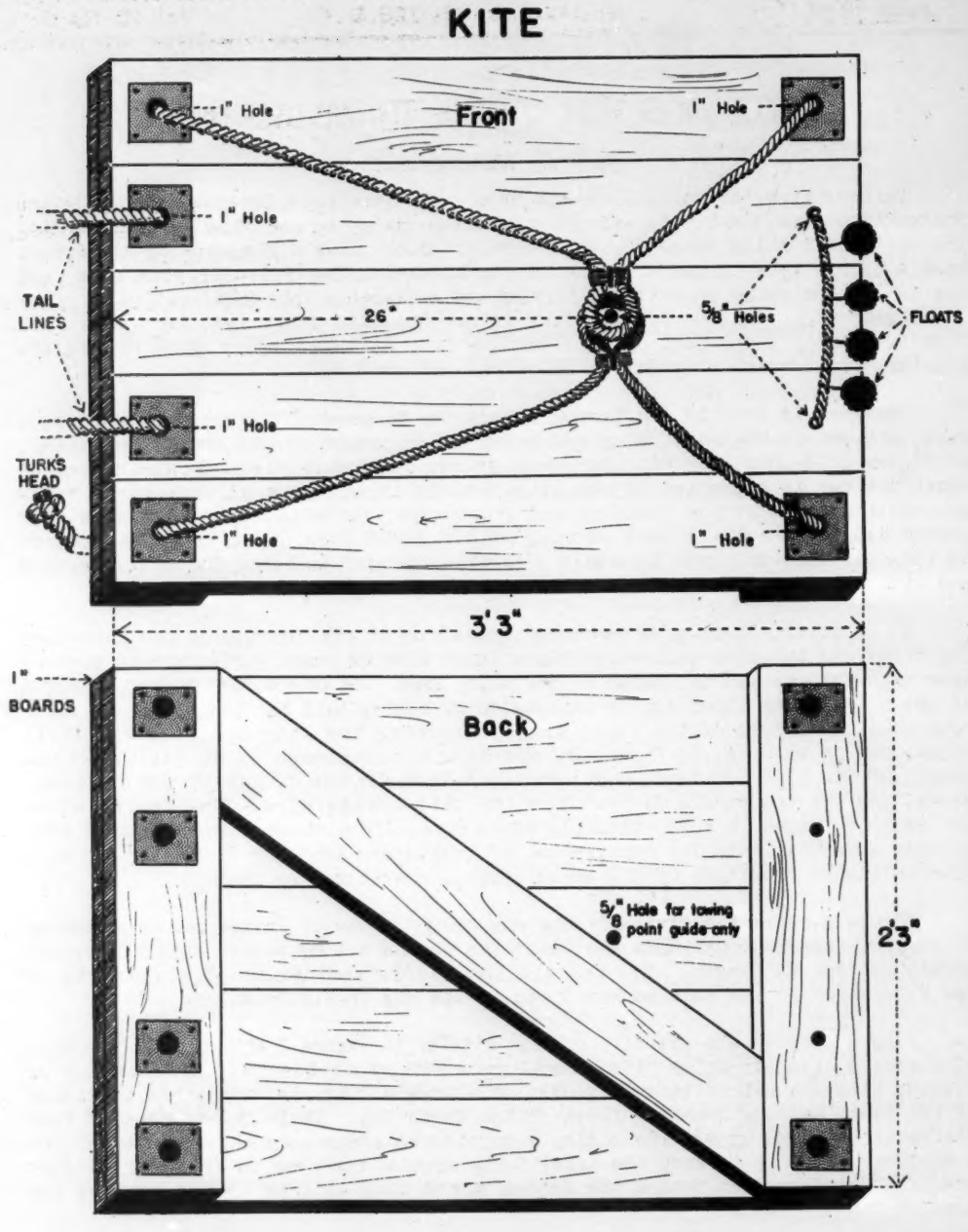

KITE
Front
1" Hole
1" Hole
1" Hole
1" Hole
1" Hole
1" Hole
TAIL LINES
26"
5/8" Holes
FLOATS
TURK'S HEAD
3'3"
1" BOARDS
Back
5/8" Hole for towing point guide only
2'3"

FIGURE 1

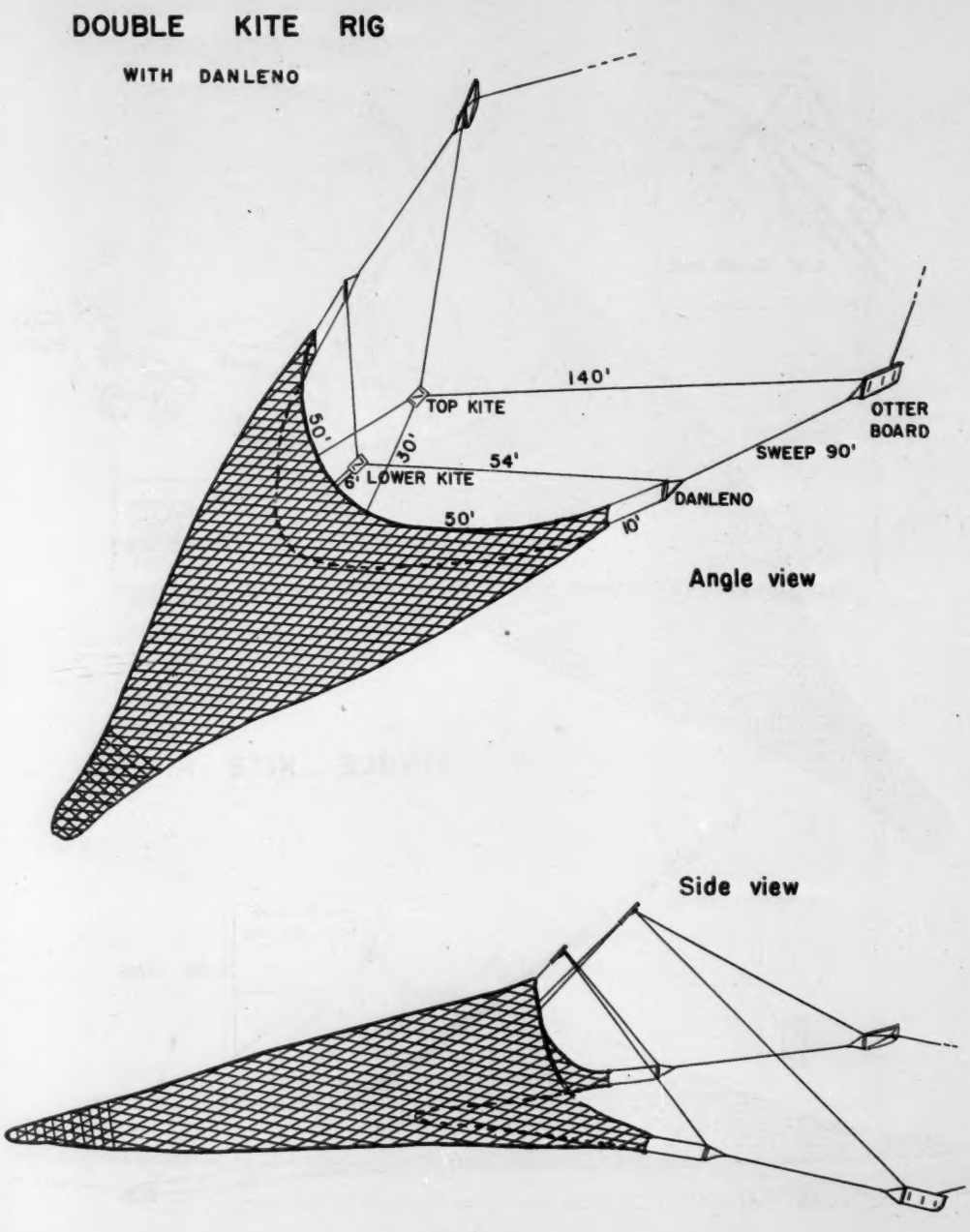

DOUBLE KITE RIG
WITH DANLENO
140'
TOP KITE
OTTER BOARD
50'
30'
54'
SWEEP 90'
6' LOWER KITE
DANLENO
50'
10'
Angle view
Side view

FIGURE 2

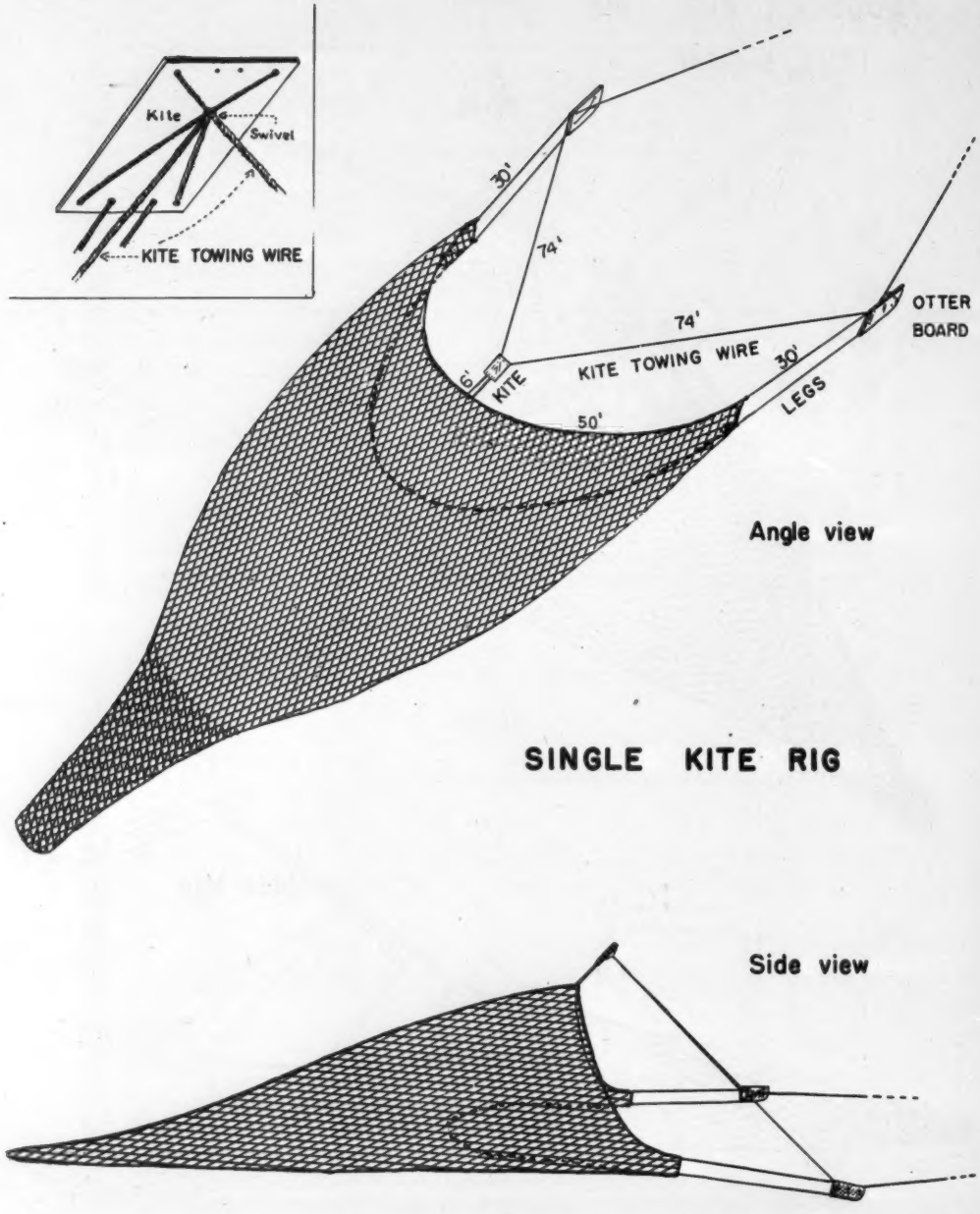

Kite
Swivel
KITE TOWING WIRE
30'
74'
74'
OTTER BOARD
KITE TOWING WIRE
30'
6'
KITE
50'
LEGS
Angle view
SINGLE KITE RIG
Side view

FIGURE 3

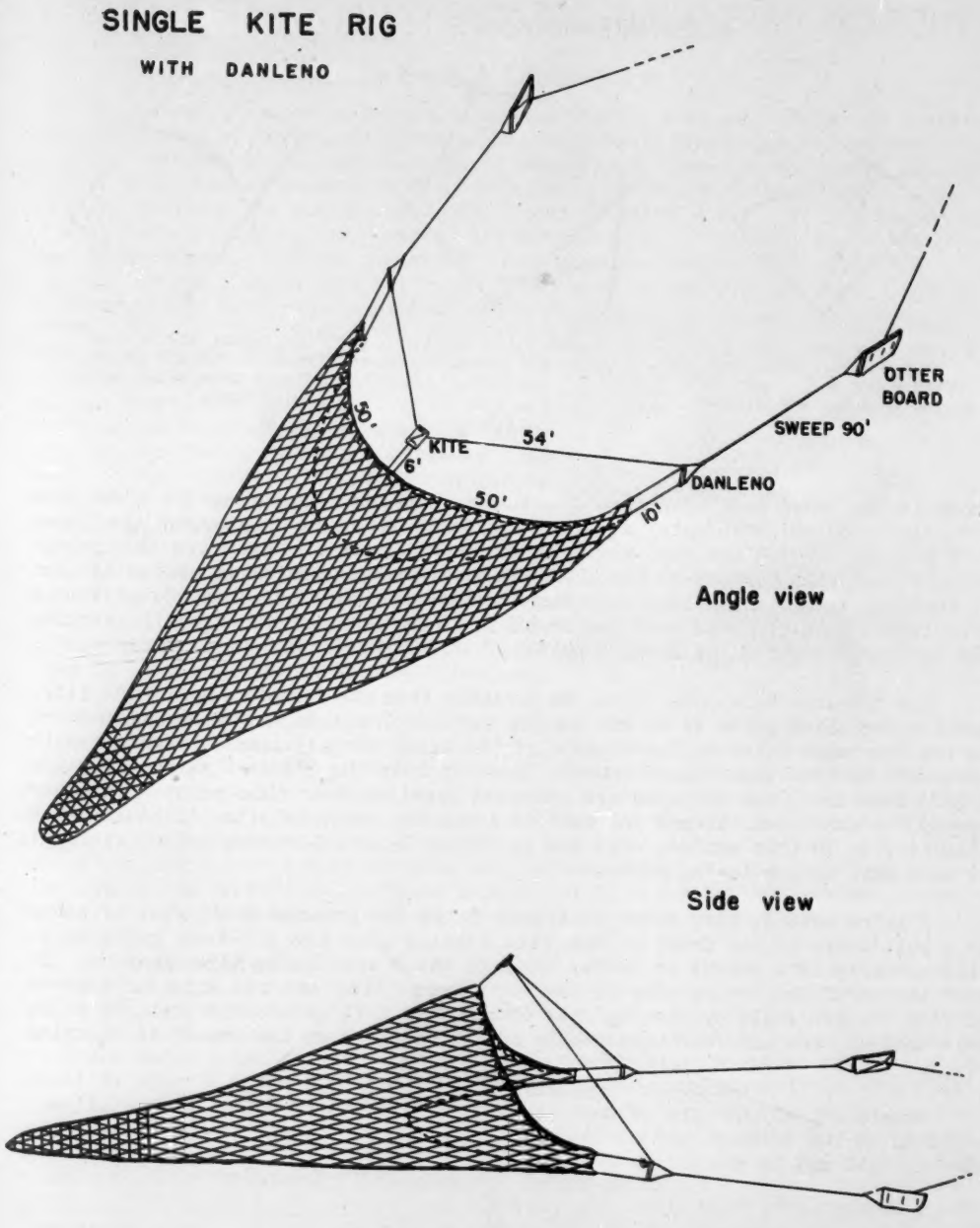
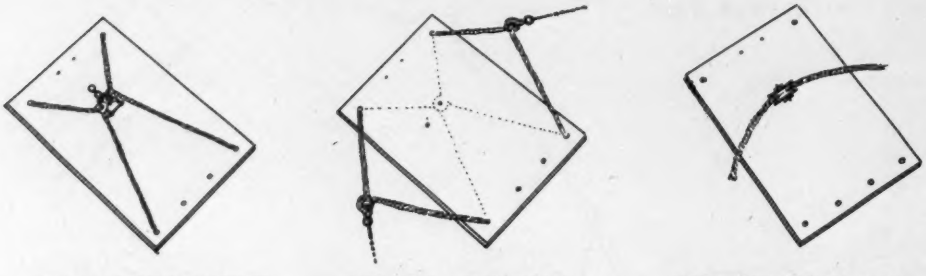

SINGLE KITE RIG
WITH DANLENO
OTTER BOARD
SWEEP 90'
KITE
54'
6'
DANLENO
50'
10'
Angle view
Side view

FIGURE 4

ALTERNATE HOOK-UPS FOR KITE



A. BOTH KITE ARMS SHACKLED TOGETHER OVER KITE-TOWING GUIDE HOLE. BOTH TOWING WIRES ARE BROUGHT INTO THIS SHACKLE.

B. KITE ARMS INDIVIDUALLY HOOKED INTO TOWING WIRES.

C. CONTINUOUS TOWING WIRE RUNNING THROUGH SHEAVE PLACED OVER KITE-TOWING GUIDE HOLE.

FIGURE 5

shown in the lower part of Figure 1. The main holes for taking the kite arms are reinforced by sheet metal squares both front and back to prevent the lines from pulling through the wood while under heavy strain. These are the 1-inch holes in the four corners of the kite. The arms are most frequently made of 2½-inch circumference manila line, but sometimes they are also made of 1-inch circumference wire rope. A Turk's head knot, as shown in the upper part of Figure 1, secures the kite arms against the forward pull.

The 5/8-inch hole, one-third the distance from the forward edge of the kite, makes a permanent guide as to the towing point. The arms, after being secured in the four main holes in the corners of the kite, are adjusted to such a length that each of them when folded inward, lines up over the 5/8-inch permanent guide hole. Sometimes, the two arms are shackled together over this point. In other cases, the arms open outward and each is connected separately to its towing wire (Figure 5). In this method, each arm is fitted with a 3/8-inch swivel where it is made fast to the towing wire.

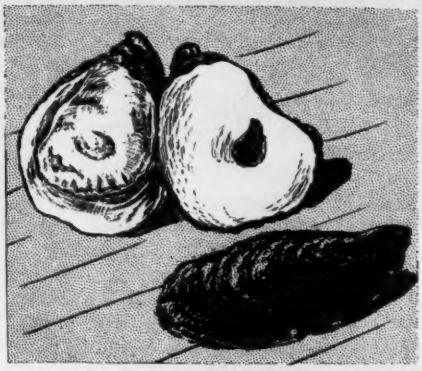
A third method, also shown in Figure 5, is the attachment of what is known as a bull's-eye to the front of the kite exactly over the 5/8-inch guide hole. This actually is a sheave or roller through which the towing wire is rove. In this instance, the towing wire is one continuous line and the kite is allowed to find its own angle by running free on the wire. It is claimed that, by using this hook-up, the kite can more easily adjust itself when the vessel is changing course.

Regardless of the type of hook-up used for the kite arms, four metal floats attached to the forward part of the kite, as shown in Figure 1, help to keep the kite upright and in the proper position when the gear is being set out.

# A SERIOUS SITUATION CONFRONTING THE OYSTER INDUSTRY[1/]

By Walter A. Chipman, Jr.*

At present, the oyster industry is experiencing a crisis. There is a widespread scarcity of marketable oysters and, in general, the quality of oyster meats is poor. Oysters are indeed becoming so scarce that there are not enough of them to give a livelihood to many persons engaged in their gathering. As an illustration, consider the conditions in the upper Chesapeake Bay. At the beginning of this century, the oyster rocks of the Maryland part of the Bay supported more than 500 dredgers. Fifteen or twenty years ago, there were still about 200. In the fall of 1947, there were but 16 dredgers operating in Maryland. The situation in other States is even more serious. Public oyster bars have been completely depleted in Georgia; there is a continuous decline in the production of oysters in South Carolina, Florida, and Texas; and the mortality of oysters in Louisiana waters threatens the very existence of the large oyster industry of that State. This critical shortage has developed as a result of many years of mismanagement of public oyster grounds and continuing destruction of bottoms by domestic and industrial pollution. Except for these two factors, the natural conditions in the oyster-producing States remain the same as they were years ago and the potential productivity of public rocks today is as high as it has been in the past.



It is a well established fact that a high level of productivity of shellfish bottoms can be maintained only through the application of well developed and sound principles of cultivation or oyster farming. Natural oyster grounds are the most suitable bottoms for the cultivation of oysters. Virtually in all the States, these bottoms are classified as public grounds and open to tongers or dredgers. In the majority of the oyster-producing States, no sustained efforts are being made for the rehabilitation of public grounds and, consequently, the largest portion of them become non-productive; yet these grounds, still listed as public rocks, cannot be leased to private growers and are useless to the fishery.

In the few coastal States where rehabilitation of oyster bottoms has been attempted, it was limited to the planting of shells or seed. In many instances, the results were unsatisfactory because of the lack of technical knowledge in oyster cultural methods or wastefulness in conducting planting operations. In a few cases where planting was successful, the rehabilitated bars were depleted almost as soon as they were open to fishermen because no control was exercised over the harvesting of the oysters. From a national point of view, it is immaterial whether the cultivation of oysters is conducted by State governments or by private industry. The essential fact is that the supply of oysters on the grounds open to commercial fishing cannot be maintained by natural propagation alone. Planting of seed, control of enemies, and regulation of harvesting are

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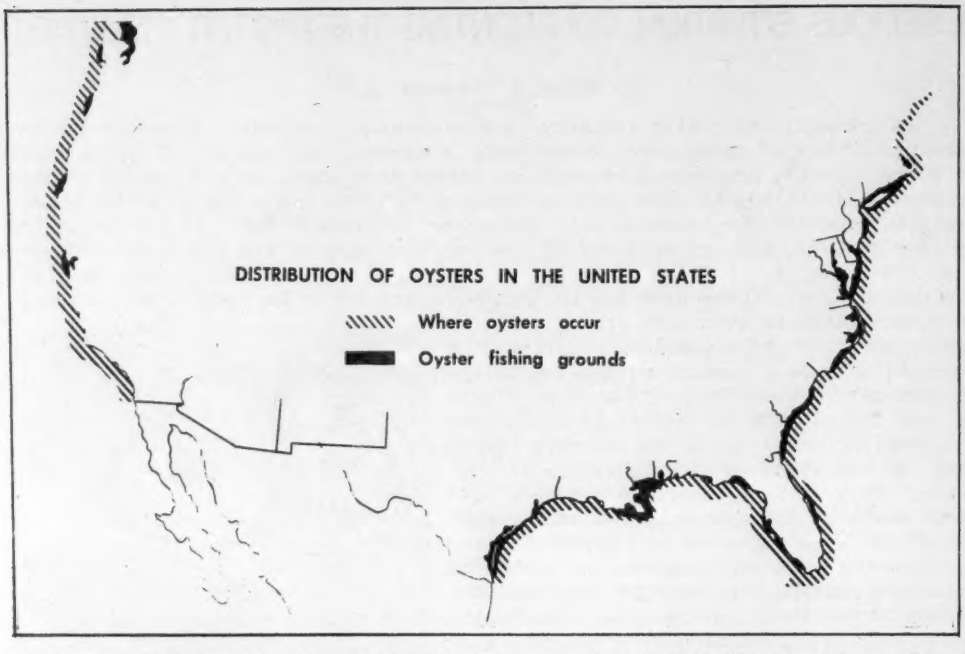
1/A paper presented at the joint meetings of the North Atlantic, Middle Atlantic and Chesapeake Bay Sections of the Atlantic States Marine Fisheries Commission in New York on February 19, 1948.




needed to maintain the productivity of these grounds. Restrictions, such as closed seasons, limitation on the type of gear used, and similar measures applied to the bottoms open to dredging are not sufficient because, even with these, with a few exceptions, the rate of propagation on natural rocks is too slow and cannot replenish the stock removed by commercial fishing.. The greatest danger is that overfishing with lack of cultivation will deplete the grounds beyond the possibility of their restoration.

Since State governments have exclusive jurisdiction over their respective oyster grounds, each State must decide whether it should initiate its own plan of rehabilitation and management or release the grounds to private oyster farming. Observations and experiments conducted during the past four years by the U. S. Fish and Wildlife Service in the Chesapeake Bay show that, from a purely technical point of view, the State management of oyster grounds, which is the principal method for restoring the productivity of oyster bottoms, is sound and feasible. The execution of a State plan requires, however, a large investment of capital, an amount far exceeding the public funds available for this purpose to the State governments. On the basis of prices prevailing during the past year, $150.00 must be considered as the minimum cost of planting one acre of public ground with seed oysters. To restore many thousands of acres of depleted bottoms would require, therefore, a capital investment of many million dollars. For several years, the State of Maryland has tried the State management plan with only partial success. Greater accomplishments were not obtained since the capital needed far exceeds the money available to the State for that purpose.

Instead of going into the business of producing oysters for the market, it appears more practical for the State government to direct its efforts to the development and improvement of seed oyster grounds from which small oysters can be

taken by individual planters. Insufficient seed is the principal difficulty of the shellfish industry. There are only a few places along our coast where nature provides conditions favorable to the production of young oysters. Unfortunately, most of these places are located in the harbors, bays, or in the mouths of rivers, close to centers of industrial development and, therefore, subject to industrial and domestic pollution. It is the duty of State governments to protect these grounds from further destruction and to increase their productivity. If the funds available to various States for the rehabilitation of shellfish bottoms be spent for the restoration and maintenance of public seed oyster grounds, the money will be used in a most effective and advantageous manner.

PLANTING SEED OYSTERS, CHINCOTEAGUE, VA.

For many years, the oyster industry of the entire Chesapeake Bay was dependent on seed oysters obtained from the James River. At present, the productivity of the James River grounds has diminished to such an extent that the State of Virginia has been forced to impose severe restrictions on the planting of this seed outside of the State waters. It is not an exaggeration to state that the oyster industry in Virginia would collapse if seed oyster grounds in the James River became non-productive. It is not known for certain what particular conditions in the James River are primarily responsible for the high productivity of its seed oyster grounds. It is reasonable to assume that the salinity of the water, the run-off of the river, and the character of the bottom are the important factors. There may be, however, other conditions or factors which make the James River oyster rocks the most productive seed oyster area in the world. There is a project of the Federal Government to regulate the flow of the James River by the construction of dams. Undoubtedly, this project will be beneficial for controlling floods, but it is also obvious that it would materially change the present regime of the river. It is impossible to foresee whether these changes will be beneficial or destructive to seed oysters. The James River seed grounds are, at present, free of oyster drills, or screw borers, which are prevented from invading these bottoms by a low salinity. Slight increase in the concentration of salts, not exceeding two or more parts per thousand, would be sufficient to permit the drills to migrate from the mouth of the river upstream and invade the seed oyster area. This invasion would destroy the very foundation of the oyster industry in Virginia and of the Chesapeake Bay in general. It appears, therefore, necessary to make a thorough study of the James River seed oyster grounds in order to determine conditions that should be maintained to ensure their sustained productivity. The problem is complex and difficult, but not unsolvable. The project would require annual expenditures of but a small fraction of the cost of the huge engineering project.

COMMON OYSTER DRILLS, ENLARGED TWICE, USUALLY AVERAGE 1 INCH LONG

Protection of shellfish grounds against pollution is a difficult and, frequently, a thankless job. The economic benefits to local communities derived from pulp mills, oil wells, and other industrial developments, which are primarily responsible for the pollution of coastal waters, may far exceed local benefits obtained from fishing and the processing of fishing products. There is no question as to the economic importance of mineral developments or of the manufacturing industries. The primary concern of all should be the working out of methods which would permit the co-existence of the various industries. This goal may be achieved by research in the problems of utilization of industrial byproducts, by developing safe methods of disposal of those poisonous industrial wastes which must be discarded, and by enforcing of anti-pollution laws.

Considerable progress has been made along these lines. Organizations for the abatement of pollution have recently brought to the fore evidence that many of our streams can and, eventually, will be made safe for aquatic life. There is need, however, of more attention to pollution of our coastal waters where industrial development is taking place at a rapid rate. In the past, the U. S. Fish and Wildlife Service has conducted many studies on the effect of various types of pollution on the aquatic life of our bays and estuaries. No investigation or study conducted by a Governmental agency brings practical results unless the way is found to apply the findings in practice. The Federal Government has been lacking in authority to enforce anti-pollution measures. Protection of our shellfish-producing water bottoms from the destruction brought about by industrial pollution, particularly the guarding of our seed oyster grounds, is vital for the continuation of the oyster industry.

In summarizing, the Fish and Wildlife Service believes that, because of the prohibitive cost of large scale operations, it appears more advantageous for State governments to concentrate their efforts on their seed oyster grounds. The following measures seem to be most desirable:

> Protection and development of the seed oyster grounds from which seed oysters may be taken by private planters.
>
> Adoption of a practical system of State management of these grounds under which the public funds invested in rehabilitation be returned through a tax imposed on seed oysters taken by private planters.
>
> The encouragement of private planting by liberalizing leasing laws, reclassification of public grounds, and establishment of experimental or demonstration oyster farms.

By retaining full control over the seed grounds and by restricting the leasing of grounds, the respective State governments could protect the interests of individual oystermen and prevent concentration of large holdings of oyster grounds by a few large companies.

# TECHNOLOGICAL STUDIES OF THE STARFISH

## PART V - STARFISH AS FERTILIZER

By Charles F. Lee*

### INTRODUCTION

The four previous papers of this series of technological studies of the starfish (Asterias forbesi) have reported data in the literature, as well as those obtained in these investigations on the chemical composition of starfish, use of starfish meal as a protein feedstuff, and on the presence of thiaminase in raw starfish and starfish meal. The present paper gives the results of an investigation on a small local scale directed towards the better utilization of starfish as fertilizer.

Most of the reports on the utilization of starfish prior to 1942 have been concerned with its value as fertilizer (Kole, 1919 and Vachon, 1920). Since 1942, the dried starfish meal has been found to have sufficient value as a protein supplement for poultry feeds so that any meal which could be produced could be used for this purpose. The only recent reports of its use as fertilizer have been limited to the use of whole raw starfish. The starfish landed at Providence during the period when the State of Rhode Island was paying bounty on the pests were disposed of in this way (Gibbs, 1941 and 1946). There have been other unpublished reports of similar use of small quantities on private gardens and small farms.

In general, reports of the use of starfish for fertilizer have been quite favorable. So far as is known, however, none of the trials have been adequately planned, with control and competitive plots, to permit comparison of starfish with balanced commercial fertilizers.

Starfish, on the basis of chemical analysis, is a source of organically bound nitrogen, containing negligible amounts of phosphorus and potassium, the latter two elements being of primary importance in balanced fertilizers. The ash content, largely calcium carbonate, may amount to 60 percent by weight of the meal and dilutes the nitrogen to a fairly low value, less than 5 percent on a dry matter basis. As a fertilizer, this calcium carbonate is a desirable addition for acid or "heavy" soils. Starfish were not being used in any way and since they have some fertilizer value, an investigation was made to determine a practical way to use raw starfish as fertilizer. Most starfish are taken in the spring and summer, and piles of raw, untreated starfish decompose rapidly at the temperatures prevailing during these seasons. The odors thus developed would condemn handling

* Chemical Engineer, Fishery Technological Laboratory, Branch of Commercial Fisheries, College Park, Maryland.

NOTE: Part I of this series, "Starfish Control--Its Economic Necessity and Methods Used," appeared in the January 1948 issue of Commercial Fisheries Review, pp. 1-6. Also available as Sep. No. 193.

Part II, "Chemical Composition," appeared in the February 1948 issue, pp. 11-18. Also available as Sep. No. 196.

Part III, "Value of Starfish Meal--Protein Supplement for Growth of Rats and Chicks and for Egg Production," appeared in the March 1948 issue, pp. 8-19. Also available as Sep. No. 199.

Part IV, "Thiaminase in Starfish," appeared in the May 1948 issue, pp. 12-19. Also available as Sep. No. 204.

in this manner, inasmuch as most of the starfish are landed in sizable cities, such as New Haven and Milford, Conn., and Providence, R. I.

Because of the rapidity with which starfish decompose, it is the general practice for those taken in control operations to be shoveled overboard before reaching port. The suggestion was made that if these starfish could be treated so as to delay decomposition, sufficient quantities might be accumulated to justify hauling the material some distance to farms where it could be used as fertilizer. In this way, small and scattered amounts of starfish could be utilized when and where landed, largely eliminating adverse factors of cost of transportation and irregularity of supply which practically prohibit the use of starfish as raw material in fish meal drying plants.

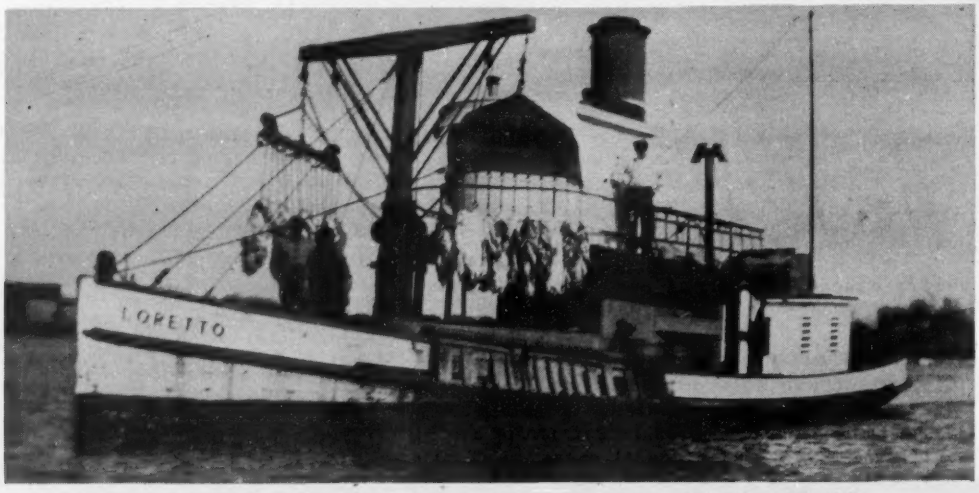
## EXPERIMENTAL

In the early days of the menhaden oil industry, sulfuric acid was often used to delay decomposition of the presscake until enough had accumulated to operate the driers. For this purpose, 3 to 5 percent sulfuric acid by weight gave the desired result. The suggestion was made that a similar small amount of acid might be equally effective on starfish.

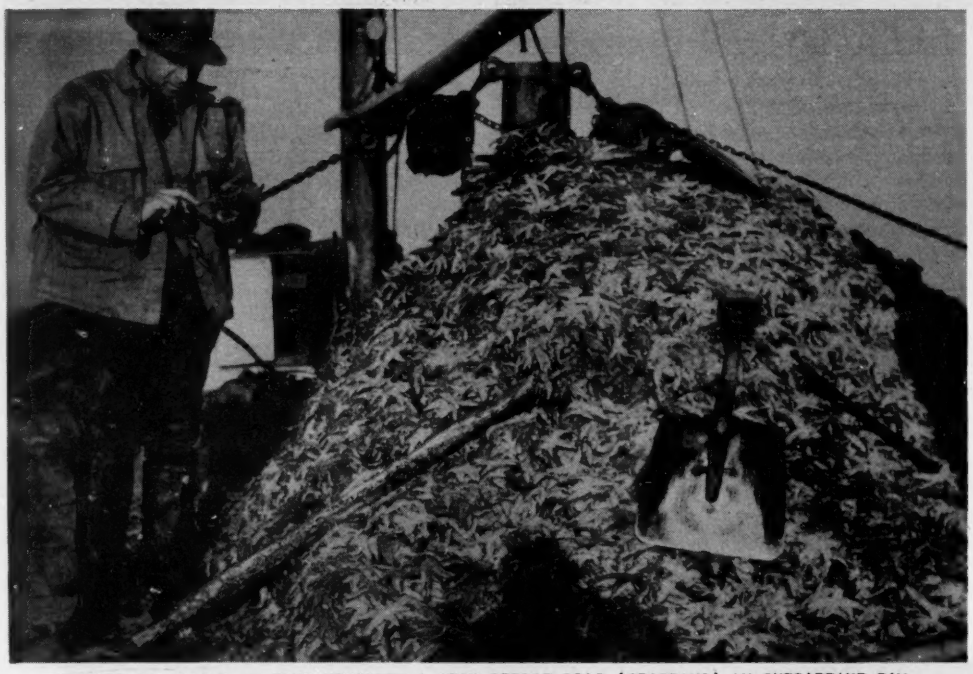
Therefore, a field trial was planned, using freshly caught starfish handled in a manner similar to that necessary in any practical adaptation of the process. Various quantities and concentrations of sulfuric acid were used to determine the optimum conditions for the desired effect.

Preliminary tests in the laboratory had shown that the starfish could withstand fairly concentrated acid without rapid structural breakdown. For greater safety in handling, the first tests were carried out with dilute acid.

Concentrated sulfuric acid was siphoned into a quart measure and added to an amount of water in a stoneware crock, which would give the desired dilution. This




TYPICAL STARFISH BOAT, OPERATING IN LONG ISLAND SOUND, EQUIPPED WITH MOPS



STARFISH CAUGHT IN FOUR HOURS BY A CRAB DREDGE BOAT (CRABBING) IN CHESAPEAKE BAY

technical grade acid, 56 Baume acid, cost at that time about 3 cents a pound in 5-gallon carboy lots. Great care is needed in the mixing operation. The concentrated acid is rapidly, and the dilute acid more slowly, corrosive to both skin and clothing, and the dilute acid rapidly attacks any metallic equipment unless lead lined. Rubber gloves and rubber equipment are desirable as protective clothing, and a stoneware crock is the best mixing container usually available. In the use of stoneware, care is also necessary to prevent cracking from the heat generated by too rapid addition of acid to water. The above properties should be considered because of the danger which would be involved if the acid were to be handled by oystermen or farmers without special equipment and knowledge of the precautions necessary for safety.

The starfish used in the present investigation had been picked from mops by the starfishing crews of a New Haven, Conn., company, and the acid treatment was carried out in the grounds of the plant. Two lots were collected, on October 28 and 30. Approximately 200 pounds of starfish in the first lot were divided into three piles. No facilities were available for weighing the material so all quantities were estimated. The 3 batches of starfish were then treated with 3 dilutions of acid, 1 to 9, 4 and 2, parts of water by volume, respectively. An equal quantity, 6 quarts, of each dilution was used, and this amount was sprinkled slowly over the piles during the course of about one-half hour. The starfish were turned and mixed with a fork several times during the process.

There was a rapid initial action of the acid with exposed carbonate in the ambulacral spines, etc., but this soon slowed down, and a considerable amount of

the acid thereafter ran off to the ground and was lost. The calcareous, exoskeleton makes the starfish very non-absorbent and difficult to treat by ad-mixture of any liquid in this manner. The fact that the calcium sulfate formed by the acid action is only slightly soluble in either acid or water further tended to hinder the reaction going rapidly to equilibrium.

In treating the second lot of starfish, a single concentration of strong acid, 1 part of acid to 1 of water by volume, was used in an effort to lessen the loss by run off, and the volume of acid was varied. The lot was divided into 4 batches which were treated with 2, 3, 4, and 7 quarts, respectively, of the 1 to 1 acid in the same manner as the first lot. The weights of the individual batches were estimated to be about the same as for lot 1, or approximately 70 to 80 pounds each.

After treatment, the starfish were allowed to remain in a pile for a time in order to allow absorption of as much of the acid as possible. They were then raked out into a thin layer on the ground to dry. Threatening rain on October 29 made it necessary to take the first 3 lots into the shelter of a shed. October 30, the weather cleared and all 7 lots were spread outside to dry. Unfortunately, during the night, the whole area was flooded by an exceptionally high tide, so that all piles were under water the morning of October 31. Some starfish floated off but the bulk of each lot was forked out of the water and moved to high ground. The next day, rain again made it necessary to move the starfish inside so that on the following day the material was packed into barrels and shipped to College Park.

## RESULTS

At the time of shipping, decomposition had already begun in the batches treated with 6 quarts of 1 to 9 acid and 2 quarts of 1 to 1 acid and only small amounts of these batches were shipped (batches 1 and 4, Table 1). Some spoilage was also

Table 1 - Results of Treating Starfish with Sulphuric Acid

| Batch number | Concentrated acid used | Approximate part of acid used to 100 parts starfish | Nitrogen, dry basis | Calcium carbonate, dry basis | Approximate efficiency of acid action |
|---|---|---|---|---|---|
| | Pounds | | Percent | Percent | Percent |
| Lot 1: | | | | | |
| 1 | 2.30 | 3.5 | 4.72 | 46.4 | 96 |
| 2 | 4.60 | 6.5 | 4.23 | 38.8 | 77 |
| 3 | 7.95 | 11.0 | 4.47 | 32.4 | 59 |
| Lot 2: | | | | | |
| 4 | 3.85 | 5.5 | 4.79 | 43.0 | 73 |
| 5 | 5.75 | 8.5 | 4.70 | 35.8 | 71 |
| 6 | 7.65 | 11.0 | 4.52 | 32.1 | 62 |
| 7 | 13.40 | 19.0 | 4.43 | 22.9 | 47 |

evident in the batches which had been treated with 6 quarts of 1 to 4 acid and 3 quarts of 1 to 1 acid (batches 2 and 5, Table 1). The condition of the other 3 batches indicated fair preservation, evident by the comparative stiffness of the starfish, which normally mat together quite cohesively. This matting makes it difficult to sun-dry fresh starfish, and consequently, the acid treated samples would dry relatively easily and rapidly, given suitable weather.

On arrival November 5, at College Park, 6 and 8 days after treatment, inspection confirmed previous conclusions as to the effectiveness of the various treatments. Only the batches treated with 6 quarts of 1 to 2 acid, and 4 and 7 quarts of the 1 to 1 acid solutions were fairly well preserved (batches 3, 6, and 7, Table 1).

In Table 1, the amount of concentrated acid used in each treatment and the approximate proportion of acid to starfish (column 3) has been calculated. Samples of each batch were ground and analyzed for nitrogen and carbonate. On the basis of previous analytical data, it was estimated that the initial nitrogen content was 4.90 percent and the calcium content was 58 percent of the dry matter.

These data (Table 1 and Figure 1) indicate that the nitrogen content is not greatly affected by the acid treatment, but that the variation which does occur is opposite to that which would be expected. In general, the lots which received the most acid have the lower nitrogen content. Since the condition of the samples did not indicate that this result could have been due to post-treatment decomposition of protein, which should have led to the exactly opposite effect, it would appear that the nitrogen was lost at the time of acid treatment, presumably by hydrolysis of part of the starfish protein to a soluble form which was then leached out.

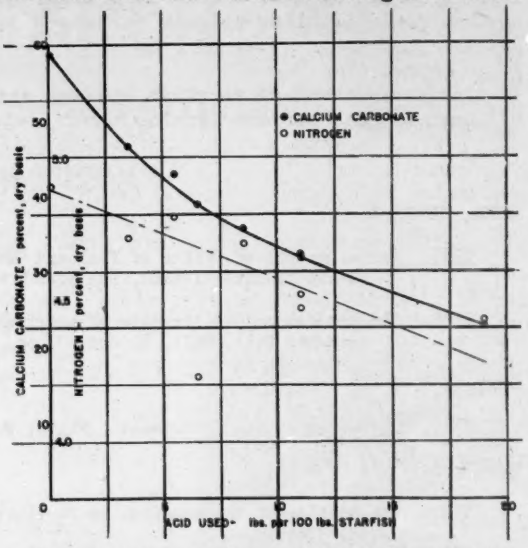

CALCIUM CARBONATE
NITROGEN
CALCIUM CARBONATE - percent, dry basis
NITROGEN - percent, dry basis
ACID USED - lbs. per 100 lbs. STARFISH

FIGURE 1 - RELATIONSHIP OF THE CALCIUM CARBONATE AND NITROGEN CONTENTS OF RAW STARFISH (DRY BASIS) TO THE AMOUNT OF CONCENTRATED SULFURIC ACID USED IN THEIR TREATMENT FOR FERTILIZER.

The calcium carbonate remaining is a measure of the extent of the action of acid with this component. A greater proportion of acid reacted with carbonate at the lowest levels of acid used. As the amount of acid was increased, the amount of unchanged calcium carbonate decreased as shown in Figure 1. The proportion of acid which reacted decreased also, until when the most acid was used only about one-half of the acid was found to have reacted with carbonate.

A portion of the excess acid must have reacted with or have been absorbed by the protein, as some preservative effect was obtained. However, most of the acid which did not form sulfate was most probably lost on the ground as run off. Even when the acid used amounted to nearly one-fifth of the weight of the wet starfish, it did not neutralize much more than 60 percent of the calcium. The excess alkaline ash must soon have restored the mixture to a nearly neutral reaction; whereas, with the menhaden type of fish meal, small amounts of acid are sufficient to maintain an acid reaction.

## CONCLUSIONS

Raw starfish, on the basis of chemical analysis, is rated as a fair source of nitrogen for fertilizer and as a poor or unimportant source of phosphorus and potassium. The calcium carbonate it contains would be beneficial when used on acid or heavy clay soils.

Treatment with sulfuric acid is not a very effective means of preventing decomposition of raw starfish to facilitate its use as fertilizer because of the large quantities of acid required. To delay decomposition, concentrated acid amounting to 15 percent of the weight of the raw starfish is required.

The cost of acid, estimated to be $35.00 per ton of dry meal, is excessive considering the relatively low value of the starfish as fertilizer. Acid treatment further decreases the fertilizer value in two ways: by loss of nitrogen, presumably by leaching of a soluble protein hydrolysate; and by replacement of part of the alkaline acting calcium carbonate by the neutral, relatively insoluble calcium sulfate.

Acid treatment of starfish involves danger to person and property in the hands of inexperienced persons lacking special equipment and protective clothing.

LITERATURE CITED

GIBBS, HAROLD N.

1941. Annual report of Office of Fish and Game. Department of Agriculture and Conservation of Rhode Island, pp. 11-12.

1946. The control and utilization of starfish in Rhode Island waters. Bingham Oceanographic Coll. Bull. 9, Art. 3, pp. 28-30.

HOLE, C. S.

1919. Garnaleen en zeesterrenmeel. Pharm. Weekbl. Neder. 56: 346-51.

VACHON, A.

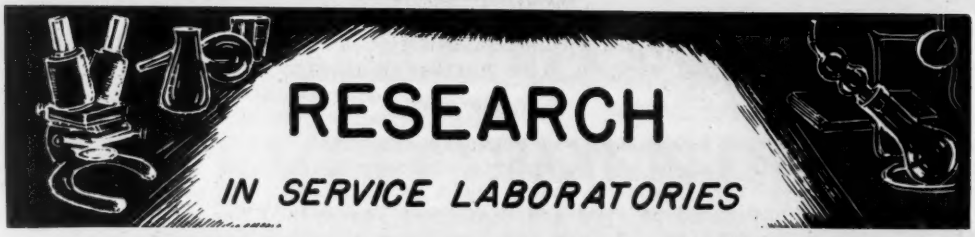
1920. The utility of the starfish as fertilizer. Trans. Roy. Soc. Canada, 14, Sect. 5, pp. 39-49.

## GUANO ISLANDS, UNION OF SOUTH AFRICA

Guano is deposited by malagas (or gannets), penguins, and duikers in the latter half of the year on the Guano Islands, Union of South Africa. The collection is undertaken during the ensuing six months. The extraordinary wealth of fish in the waters surrounding the Guano Islands is indicated by the fact that 20,000,000 birds, each requiring a minimum of one pound of fish per day, are to be found at the same time on the one Island of Ichabo. The astonishing quantity of guano on a given area is further demonstrated by the fact that Seal Island, in False Bay, with an area of one acre, yields from 30 to 80 short tons each year.

Guano is sold as a fertilizer in pulverized form and is used principally in the cultivation of cereals and vegetables. It is no longer available for orchards and vineyards on account of the big demand in other respects. Its principal chemical constituents are nitrogen, potash, phosphoric oxide, and lime, and as the composition of the deposits obtained from the different islands varies materially in certain essentials all collections are systematically mixed so as to obtain an approximately uniform grade of article.

--Fishery Leaflet 305




## APRIL 1948

## College Park, Md.

After six months in storage, sea trout fillets cut and frozen within a few hours after the fish were caught, or frozen after cutting from fish held in ice several days, showed less drip than fillets prepared from fish that were frozen and thawed before filleting and refreezing. Palatability scores were entirely satisfactory for all samples.

* * *

Preliminary feeding studies with salmon egg protein were completed.

* * *

Experimental packs of canned rosefish, smelt, pollock, tuna, and salmon were made for the school lunch sandwich spread project.

* * *

Detailed laboratory examinations were made of commercial packs of South African snoek (jack), Atlantic Coast sardines in pound oval cans, and Spanish tuna in large lithographed cans.

* * *

Bacteriological and palatability tests were conducted on freshly picked crab meat which had been exposed to ultraviolet light.

* * *

The thiamine content of frozen raw cod was determined and scheduled for further checking.

* * *

Open house held and attended by 100 persons. Seven exhibits were available for inspection: shad studies, oyster investigations, bacteriology, packaging and freezing, canning and preservation, nutrition and pharmacology, and home economics.

## Boston, Mass.

The mobile laboratory was in use at Newburyport, Mass., and at Brunswick, Me., for bacteriological work on clams and water samples from clam flats.

* * *

The head of the laboratory was recently appointed to the QMC Food and Container Institute's Liaison and Scientific Advisory Board. The Advisory Board is a part of the Research Planning Council and is composed of some 190 recognized specialists in the field of food and container research. One of its functions is to study major problems of food and container research and to recommend the programs best suited to solving them. Through this new activity, the progress in fisheries research can be brought to the attention of the leading food research organizations of the country.

* * *

New processing developments in Maine, including the canning of East Coast tuna and preparations for packing large herring in one pound oval cans, were inspected.

* * *

The Service consultant, a fishery technician from this laboratory, aboard the Deep Sea in Bering Sea reported good fishing for king crabs and the crew becoming more familiar with East Coast trawl net mending, assembly, and operating techniques.

## Ketchikan, Alaska

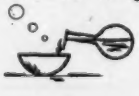
Most of the important clam producing beaches in Southeastern Alaska have been surveyed since a little over two years ago when a considerable portion of the pack was seized because of the presence of possibly dangerous toxic material. The presence of toxin was determined by testing clam extracts with mice. The several hundred samples tested ranged from less than 200 mouse units, the least that can be determined by the present standard procedures, up to 9930 mouse units. Samples from over three-fourths of the clam beds tested below 1000 mouse units. Samples from beaches in narrow inlets and bays have always been low, while those from beaches and reefs at the entrance to bays, subject to coastwise currents, were frequently high. The necks (siphons) tested from 4 to 20 times as toxic as the remainder of the body. Removal of the necks reduces the toxicity of the clams about one-half. Processing, for 40 to 70 minutes at 10 pounds steam pressure, destroys approximately 50 percent of the remaining toxin. Grinding and washing the clam meats before canning resulted in further destruction.

## Seattle, Wash.

One hundred Pribilof fur seal livers averaged about 3 percent oil with only one liver over 4 percent. The liver oil varied from 1,000 to 200,000 spectrophotometric units of vitamin A per gram.

* * *

Service observers from Seattle and Ketchikan aboard the factory ship Pacific Explorer report the vessel working near Amak Island in Bering Sea with most preliminary problems as to equipment and techniques having been worked out. King crabs were being taken in otter trawls and tangle nets.



## Additions to the Fleet of U. S. Fishing Vessels

One hundred twenty-two vessels were documented as fishing craft during April, fourteen less than in April 1947, but forty-three more than were documented in March of this year. A total of 293 fishing vessels were documented during the first four months of 1948, compared with 358 in the first third of 1947, according to information received from the Bureau of Customs, Treasury Department.

Sixteen of the vessels documented during April were registered at Louisiana ports; Washington followed with fourteen, Alaska with twelve, California with eleven, Texas and Oregon with nine each, and other States with lesser numbers.

Vessels Obtaining Their First Documents as Fishing Craft

| Section | April | | Four mos. ending with Apr. | | Total |
|---|---|---|---|---|---|
| | 1948 | 1947[1] | 1948 | 1947[1] | 1947[1] |
| | Number | Number | Number | Number | Number |
| New England | 7 | 4 | 10 | 14 | 75 |
| Middle Atlantic | 8 | 7 | 13 | 19 | 70 |
| Chesapeake Bay | 3 | 2 | 11 | 17 | 97 |
| South Atlantic and Gulf | 47 | 40 | 123 | 135 | 490 |
| Pacific Coast | 34 | 51 | 91 | 108 | 411 |
| Great Lakes | 11 | 1 | 14 | 9 | 74 |
| Alaska | 12 | 27 | 28 | 47 | 47 |
| Hawaii | - | 4 | 3 | 9 | 23 |
| Unknown | - | - | - | - | 12 |
| Total | 122 | 136 | 293 | 358 | 1,299 |

1/Revised.
Note: Vessels documented by the Bureau of Customs are craft of 5 net tons and over.

## Federal Purchases of Fish

DEPARTMENT OF AGRICULTURE, May 1948: No purchases of fish were reported by the Department of Agriculture during May 1948 nor were any reported in May 1947.

Purchases of Fishery Products by USDA

| Commodity | Unit | May 1948 | | Jan. thru May 1948 | |
|---|---|---|---|---|---|
| | | Quantity | Cost | Quantity | Cost |
| FISH | | | Dollars | | Dollars |
| Fillets, cod, frozen | Lbs. | - | - | 4,080 | 1,428 |
| " , whiting, " | " | - | - | 2,385 | 598 |
| Total | " | - | - | 6,465 | 2,026 |
| Herring, canned[1] | Actual cases | - | - | 47,145 | 144,264 |
| Pollock, flaked, canned[2] | " " | - | - | 1,385 | 7,735 |
| Whiting, canned[1] | " " | - | - | 351 | 1,074 |
| Squid, " [2] | " " | - | - | 72,500 | 362,625* |
| Total | " " | - | - | 121,381 | 515,698 |
| Grand Total | | - | - | - | 517,724 |

1/Actual cases contain 24 - 15 oz. cans.
2/Actual cases contain 48 - 15 oz. cans.
*F.O.B. origin.

DEPARTMENT OF THE ARMY: Purchases of fresh and frozen fishery products by the Army's Quartermaster Corps for the first four months in 1948 for military feeding amounted to 5,253,060 pounds.

Purchases of Fishery Products by USA*

| 1948 | Pounds | Value |
|---|---|---|
| January | 1,309,139 | $ 509,674 |
| February | 1,237,656 | 462,052 |
| March | 1,378,600 | 555,168 |
| April | 1,327,665 | 457,540 |
| Total January thru April | 5,253,060 | 1,984,434 |

*Purchases made for U. S. Army, U. S. Navy, and U. S. Marine Corps.

## Fishing Vessels Transferred to Mexican Registry

The table below shows the number of fishing vessels, formerly documented in the United States, which have been transferred to Mexican registry and flag from January 1, 1947 to May 27, 1948. These do not include vessels which may have been converted to fishing after transfer.

| | |
|---|---|
| 1947 | 48 |
| 1948: | |
| January | 9 |
| February | 11 |
| March | 35 |
| April | 13 |
| May 1-27 | 3 |
| January 1-May 27 | 71 |
| Total | 119 |

## Halibut Areas 1B and 2 Closed on June 1

The following notice was issued by the International Fisheries Commission on May 20, announcing the closing of Pacific halibut Areas 1B and 2:

NOTICE

Under authority of the Convention between the United States of America and the Dominion of Canada for the preservation of the Halibut Fishery of the Northern Pacific Ocean and Bering Sea, and as provided by regulations effective March 6, 1948, the International Fisheries Commission has determined upon the date of

June 1st midnight

as that upon which Areas 1B and 2 as defined in the said regulations shall be closed to all halibut fishing except that provided for in Article I of the Convention.

Area 1B is defined to include all convention waters between a line running northeast and southwest through Cape Blanco Light and a line running northeast and southwest through Willapa Bay Light on Cape Shoalwater.

Area 2 is defined to include all Convention waters off the coasts of the United States of America and of Alaska and of the Dominion of Canada between Area 1F and a line running through the most westerly point of Glacier Bay, Alaska, to Cape Spencer Light, thence south one-quarter east.

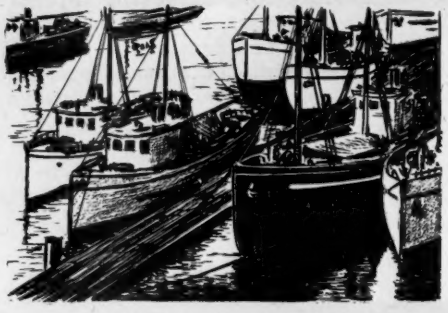
Reference should be had to a copy of the regulations for further details regarding these boundaries.

INTERNATIONAL FISHERIES COMMISSION
By
G. W. Nickerson, Chairman
Milton C. James, Secretary
May 20, 1948

This is the earliest closing date for Areas 1B and 2 in the history of the International Fisheries Commission. This year's season for Areas 1B and 2, with a quota of 25,500,000 pounds, 1,000,000 pounds over that set for 1947, was 32 days long compared with 39 days in 1947, and 42 days in 1946.

No closing dates have been announced as yet for other areas. The 1948 catch limits for Areas 3 and 4, which include that area west of Cape Spencer, are 28,000,000 and 500,000 pounds, respectively, the same as in 1947.

The 1948 halibut season is expected to be one of the shortest on record, although the catch is expected to be somewhat larger than last year.



HALIBUT AND SALMON FLEET - WEST COAST

The quantity of halibut that can be caught each year is set by international agreement between the United States and Canada. The 1948 quota is 54,000,000 pounds. In 1947, the season opened on May 1 and the quota of 53,000,000 pounds was reached on August 17. With more vessels engaged in the fishery this year, fishery experts believe that the quota from all areas may be attained by the end of July.

The Pacific halibut is an example of a resource which, after undergoing extreme depletion, was restored through careful study and regulation. As a result of the intensive fishery between 1910 and 1930, stocks of halibut in the North Pacific decreased alarmingly. Since 1930, management of the fishery by the United States and Canada under mutual agreement has increased the abundance and stabilized the fishery at a relatively high level of production. The annual yield is now about 10,000,000 pounds greater than under unrestricted fishing immediately preceding regulation and perhaps 20,000,000 pounds greater than if unrestricted fishing had continued.

# Personnel Changes

## BRANCH OF ALASKA FISHERIES

ALASKA APPOINTMENTS ANNOUNCED: To implement a new plan for closer coordination in the management of Alaska's valuable fishery and wildlife resources which the Fish and Wildlife Service put into operation on May 1, Albert M. Day, Service Director, announced the appointment on May 10, 1948, of George B. Kelez as Supervisor of Fisheries and Dan H. Ralston as Supervisor of Law Enforcement for the Territory.

The new supervisors will work under Clarence J. Rhode, recently appointed as Regional Director for the Service in Alaska.

Mr. Kelez, a native of Seattle, Wash., who has been with the Fish and Wildlife Service since April 1929 as a biologist engaged in Pacific salmon research, will be responsible for collecting information and data on which the annual commercial fishery regulations for Alaska will be based. His new duties will include the supervision of the Service's fishery biological research programs and activities in the Territory, the stream improvement program, the installation and operation of weirs, and spawning ground surveys.

In his new capacity, Mr. Ralston will have charge of the enforcement of laws pertaining to both fish and game in Alaska. He will supervise a staff of approximately 30 full time enforcement agents and 60 seasonal stream guards and patrol agents.

Mr. Ralston, a native of Oregon; has been with the Service since May 1942, as a wildlife agent at Ketchikan and Seward. Prior to that, he served for a year as Territorial highway patrolman and from April 1937 to April 1941 he was chief of police at Juneau.

## BRANCH OF FISHERY BIOLOGY

FISHERY EXPERT ASSIGNED TO ATOMIC ENERGY COMMISSION: Secretary of the Interior J. A. Krug announced on May 20 that the Fish and Wildlife Service and the Atomic Energy Commission have entered into an agreement for collaboration in planning work programs involving fish and wildlife studies of interest to the Commission.

Elmer Higgins, Chief of the Service's Branch of Fishery Biology, is being transferred to a new position in which he will devote full time to work involving the relationship of the Atomic Energy Commission and the Fish and Wildlife Service. In this position, Mr. Higgins will serve as a Special Assistant to Albert M. Day, Director of the Fish and Wildlife Service, and as Liaison Officer between the two agencies.

As an example of a joint problem that has already confronted the two agencies, Mr. Day cited the studies made in conjunction with the Bikini bomb tests to ascertain the effects of atomic explosions on the fishes--particularly the tunas--and other marine life in that area. Mr. Higgins served as Liaison Officer for the Service with the Joint Army-Navy group and assisted in planning and directing the necessary scientific studies.

Mr. Higgins, who was born in Cedar Rapids, Iowa, in 1892, has been with the Fish and Wildlife Service since 1925. He received his A.B. and M.A. degrees from the University of Southern California. In 1924, he was a graduate student in ichthyology at Stanford University, Palo Alto, Calif.

From 1925 to 1946, he served as Director of the U. S. Biological Station at Key West, Fla., and was in charge of the Bureau's South Atlantic and Gulf Coast fishery investigations. On July 1, 1926, he was promoted to the position of Chief of the Division of Scientific Inquiry, which later became the Branch of Fishery Biology. In this position, Mr. Higgins has organized and directed the Federal Government's program of fishery research in Atlantic, Pacific, and inland waters.

He represented the United States Government as a member of the North American Council on Fishery Investigations from 1923, serving as an official delegate at various conferences of the Council. Since 1938, he has been secretary of this organization and is the author of numerous articles in scientific journals and trade papers.

DR. WALFORD TO SUCCEED ELMER HIGGINS: Appointment of Dr. Lionel A. Walford as Chief of the Fish and Wildlife Service's Branch of Fishery Biology was announced on May 20 by Albert M. Day, Service Director.

Dr. Walford succeeds Elmer Higgins who has been assigned to special work with the Atomic Energy Commission.

Dr. Walford joined the staff of the former Bureau of Fisheries on July 1, 1936, as an aquatic biologist at Woods Hole, Mass. On November 1, 1937, he was transferred to Stanford University in California to specialize on Pacific pilchard studies.

In 1944, Dr. Walford was detailed to Washington, D. C. to compile and edit Fishery Resources of the United States, which was published in 1945 as Senate Document 51. This report to Congress contained the results of a survey of the marine and fresh-water fishery resources of the United States, its territories and possessions, made by the Fish and Wildlife Service.

In September 1945, Dr. Walford became Assistant Chief of the Service's Division of Information. In April 1947, he returned to fishery research and since November 5, 1947, has served as Chief of the Section of Marine Fisheries of the Branch of Fishery Biology. In this capacity, Dr. Walford has directed marine fishery research investigations in the South Pacific, New England banks, northern New England, Middle Atlantic, and Gulf of Mexico.

Dr. Walford was born on May 29, 1905, in San Francisco, Calif. He received his A.B. degree in 1929 from Stanford University, Calif., and his M.A. and Ph.D. degrees in 1933 and 1935, respectively, from Harvard.

Since 1936, Dr. Walford has served as ichthyological editor of Copeia, the journal of the American Association of Ichthyologists and Herpetologists. He is also the author of Marine Game Fishes of the Pacific Coast from Alaska to the Equator, published in 1936, by the University of California Press.

## State Department Appoints Fisheries Advisor

The Department of State announced on June 8 the appointment of Dr. Wilbert M. Chapman as Special Assistant to the Under Secretary of State. Dr. Chapman will handle coordination of international fisheries matters for the Department. Since last fall, he has served as Director of the School of Fisheries of the University of Washington, Seattle, Wash. He will report for duty approximately July 1.

He was born at Kalama, Wash., 1910. He received a B.S. from the University of Washington in 1932, an M.S. in 1933, and a Ph.D. in 1937. He has been a Scientific Assistant with the International Fisheries Commission; a Biologist with the Department of Fisheries, State of Washington; an Aquatic Biologist with the U. S. Fish and Wildlife Service. He was Curator of Fishes at the California Academy of Sciences, San Francisco, from 1943 to 1947, but was on leave of absence in 1943 to the Board of Economic Warfare to supervise the development of fisheries in islands of the Pacific for the purpose of providing fish locally for American troops. In 1947, he traveled extensively to study the fisheries in England, France, the Netherlands, Norway, Sweden, Denmark, and on the Eastern Seaboard of the United States on a fellowship from the John Simon Guggenheim Memorial Foundation. He became Director of the School of Fisheries, University of Washington, Seattle, in 1947.

He is a Fellow of the California Academy of Sciences; member of the Pacific Fishery Biologists, American Society of Ichthyologists, Institute of Food Technologists, American Association for the Advancement of Science, Western Society of Naturalists, Oceanographical Society of the Pacific, and Sigma Xi (National Science Honorary); and author of 80 odd publications on various subjects concerned with fish and fisheries.

## Wholesale and Retail Prices

Higher prices of farm products and most other foods were chiefly responsible for an increase of 1.9 percent in the wholesale index for all commodities on April 17, compared with the previous month, and an increase of 10.0 percent over a year ago, according to the Bureau of Labor Statistics, U. S. Department of Labor. The wholesale index for foods followed the same trend and increased 4.4 percent over the previous month and 9.7 percent over the corresponding period a year ago.

Although wholesale prices of foods generally increased, the average wholesale prices of canned pink and red salmon remained at the same levels as the previous month, but canned pink salmon was 68.7 percent and canned red salmon, 17.2 percent higher than a year ago.

The increase of 2.8 percent in the retail food prices brought the retail food index for 56 large cities to 207.9 percent of the 1935-39 average, and less than 1 percent below the mid-January 1948 peak. This canceled most of the decline that occurred from January through March. Food prices normally advance about 0.5 percent from March to April, however, the usual seasonal decline in the retail index for fresh and frozen fish, and fresh, frozen, and canned fish took place. On the other hand, the average retail price of canned pink salmon increased 0.8 percent over the previous month and was 32.2 percent higher than the previous year.

Wholesale and Retail Prices

| Item | Unit | | Percentage change from-- | |
|---|---|---|---|---|
| Wholesale: (1926 = 100) | | Apr.17,1948 | Mar.13,1948 | Apr.12,1947 |
| All commodities | Index No. | 162.9 | +1.9 | +10.0 |
| Foods | do | 178.8 | +4.4 | + 9.7 |
| Fish: | | Apr.1948 | Mar.1948 | Apr.1947 |
| Canned salmon, Seattle: | | | | |
| Pink, No. 1, Tall | $ per doz. cans | 5.171 | 0 | +68.7 |
| Red, No. 1, Tall | do | 6.402 | 0 | +17.2 |
| Cod, cured, large shore,. Gloucester, Mass. | $ per 100 lbs. | 14.500 | 0 | + 0.7 |
| Retail: (1935-39 = 100) | | Apr.15,1948 | Mar.15,1948 | Apr.15,1947 |
| All foods | Index No. | 207.9 | +2.8 | +10.6 |
| Fish: | | | | |
| Fresh, frozen, and canned | do | 307.2 | -2.0 | +17.7 |
| Fresh and frozen | do | 264.9 | -3.5 | +11.5 |
| Canned salmon: | | | | |
| Pink | ¢ per lb. can | 52.1 | +0.8 | +32.2 |

## PLANTING AND MARKETING OYSTERS IN THE PACIFIC NORTHWEST

For a number of years, it was thought that the Pacific or Japanese oyster would not spawn in our waters, and the Japanese seed producers encouraged that belief. In 1936, however, temperature conditions were ideal, the oysters had probably become acclimated and a good set took place. Willapa Harbor, Washington, was covered with spat to such an extent, in fact, as to be a nuisance to some of the growers who, in paying for gathering oysters by the bushel, found that the spat on the marketable oysters decreased the number of grown oysters to the bushel and, as a result, tonging costs went up. Since that year, the Pacific oyster has spawned in other areas on our coast.

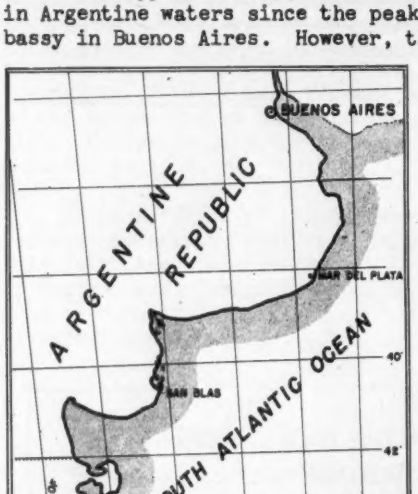
When the war cut off seed importation from Japan, oyster growers had to depend upon locally-grown seed. Each year, oyster shells, strung on wire, are hung upon racks in favorable areas for the catching of spat. Spawning varies from year to year, depending upon water temperature and other factors; in 1943, for example, there was a near failure resulting apparently from low water temperatures during that summer.

--Fishery Leaflet 52

# FOREIGN

## Argentine Republic

SHARK LIVER OILS: The catching of sharks for the production of vitamin-rich liver oil appears in 1947 to have continued the decline which has been taking place in Argentine waters since the peak year of 1944, according to the American Embassy in Buenos Aires. However, the level of activity is still much higher than in all years prior to 1944. According to the Ministry of Agriculture, the catch of sharks in 1947 amounted to 6,660 metric tons as compared to 7,521 tons in 1946, and 10,303 tons in 1944. In 1938, 10 years previously, the catch was estimated at only 7 tons.




The current decline is explained as being due more to difficulties in finding sufficient fish than to lack of price incentive. Semi-refined (washed with caustic soda) shark liver oil, at present, is quoted in Buenos Aires at 27 to 30 cents per 1,000,000 units of vitamin A, f.o.b. This price is regarded as being above the prevailing level in the United States. Bidding in the Argentine market has recently been stimulated by the purchasing activities of French interests, who are understood to have in mind refining the oil for eventual re-sale to U. S. outlets.

According to unofficial tabulations (see table) exports of shark liver oil from Argentina in 1947 amounted to 334 metric tons. Of this volume, about 50 tons is thought to have been carry-over from 1946 and 34 tons was tare, thus giving a net 1947 production of 250 tons of oil. This estimate squares closely with the Ministry of Agriculture's figure of 246 tons. The shipment of 1947 production is thought to represent between 12 and 15 trillion units of vitamin A. The average potency for Argentina is around 60,000 units per gram, factor 1894, according to one leading trade concern. The official estimate of 1946 production of shark liver oil was 285 tons.

Government fishery technicians believe that a part of the decline in shark catches is due to the practice of fishing with multi-hooked lines instead of nets and the consequent tendency to kill or fatally injure females or young sharks of both sexes when a return to the seas is attempted, if indeed it actually is attempted. There also may have been considerable overfishing. After several good years off Mar del Plata, fishing crews found it necessary to move southward to Nechochea. Later, when catches again dwindled, activities were extended to Bay San Blas. During the past season, fishermen have encountered only fair luck as

far south as Camarones on the coast of the Territory of Chubut, considered the southernmost limit of practical operations.

Argentine Exports of Fish Oils - Year 1947 and January-February 1948
(In metric tons)

| Country | SHARK LIVER OIL | | OTHER FISH OILS | |
|---|---|---|---|---|
| | 1947 (12 months) | 1948 Jan. & Feb. | 1947 (12 months) | 1948 Jan. & Feb. |
| Belgium | - | - | 624.3 | 55.6 |
| Colombia | - | - | 10.9 | - |
| Czechoslovakia | - | - | 280.1 | - |
| Denmark | 0.4 | - | - | - |
| France | 82.3 | 6.7 | - | - |
| Holland | 0.6 | - | 144.4 | - |
| Ireland | - | - | - | 111.7 |
| Italy | - | - | 228.3 | - |
| Norway | 3.7 | - | - | - |
| Sweden | 5.5 | 3.1 | - | - |
| Switzerland | - | - | 55.5 | - |
| United Kingdom | 106.1 | 1.9 | 209.9 | - |
| United States | 141.2 | 24.4 | - | 50.0 |
| Venezuela | 0.2 | - | - | - |
| Totals | 340.0 | 36.1 | 1,553.4 | 217.3 |

FISH OIL AND MEAL: The principal source of fish oil, other than that extracted from shark livers, is the sábalo (Prochilodus platensis). It is taken mostly in the Uruguay River near Gualeguaychú. This fish feeds on the surface at times in great schools and is caught with nets suspended across the river. The haul is immediately boiled whole in large vats and the oil is obtained partly by flotation and partly by subsequent pressing of the resultant meal.

The Ministry of Agriculture estimates that 16,951 metric tons of sábalo and other fresh-water fish were processed in 1947 for oil and meal, as compared with 9,457 tons in 1946. The 1947 oil yield is computed at 2,005 tons as compared with 954 tons in 1946. Meal production in 1947 is reckoned at 2,132 tons as compared with 1,841 tons in 1946. In addition, a small additional lot of 21 tons of meal was processed from ocean fish in 1947, about 26 tons less than in 1946.

The production from the whale catch by Argentine vessels in 1947 is reported by the Ministry of Agriculture to have been 8,849 metric tons of oil, 4,754 tons of guano, and 338 tons of meat meal. In 1946, the respective totals were 8,330 tons of oil, 5,016 tons of guano, and 262 tons of meat meal. It appears, therefore, that whaling by Argentine interests is being maintained at about the same level, due in part to the fact that no additions have recently been made to the fleet of vessels.

In connection with the whaling situation, it was announced at mid-April that the Ministry of Agriculture would establish a service of inspection for frozen or salted whale meat with a view to facilitating its acceptance abroad for human consumption.

## Australia

STATUS OF TUNA FISHERY: Tuna is neither being caught nor frozen by any Australian concern at the present time, according to an American Consulate General

report from Sydney, Australia, dated April 28, 1948. There is, however, considerable interest in establishing a tuna industry, but as yet, no concrete action has been taken.

Informed sources are of the opinion that any contemplated fishing for tuna would be done in Australian, not Japanese, waters. It is also expected that the fish would be canned rather than frozen.

## Canada

CANADA FISHERIES ASK REVISION OF U. S. TARIFF ON CERTAIN FISH ITEMS: Resolutions requesting revision of the United States customs tariff on salt fish, canned salmon, and canned tuna have been referred to the Departments of Fisheries and Trade and Commerce, according to the April 1948 Fisheries Council of Canada Bulletin. The Canadian Department of Trade and Commerce has advised that these items have been noted for negotiation with the United States whenever the opportunity becomes available, and they will be glad to receive briefs from the industry for the guidance of the Department in preparing representations to the United States authorities. The council has been accorded an opportunity to appear before the Standing Committee on Banking and Commerce of the House of Commons on May 11 to present the views of the industry on the Geneva Trade Agreements.

* * * * *

FISHERIES TRENDS: In the disposition of the first quarter 1948 catch of Atlantic Coast fish, more cod is being frozen and smoked in the filleted form than a year ago, according to the April 1948 issue of the Monthly Review of Canadian Fisheries Statistics, Dominion Bureau of Statistics. The production of fillets of haddock and other groundfish has also been increased. Almost the entire lobster catch has been sold in the shell. Major adjustments on the west coast include the greater use of herring for reduction, and a switch from the canning of other shellfish to the sale of this product in the shucked meat form. Imports of fresh and frozen cod and other groundfish from Newfoundland, pickled herring from the United States, and canned sardines from Norway have all expanded considerably over the same period of 1947. Exports of fishery products to the end of March totaled $23.8 million this year in comparison with $20.5 million during the first quarter of 1947. The increase was mainly to the United States in the fresh and frozen forms.

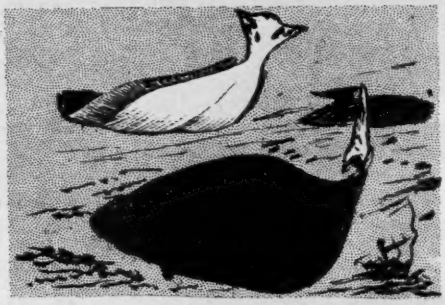
No significant change is noted in prices received by fishermen or in the wholesale and retail trades. However, in April, prices received for cod and related species tended to be higher on the Atlantic Coast.

* * * * *

HALIBUT FISHING IN BRITISH COLUMBIA: The halibut season opened on May 1, 1948, amid predictions that it will be the most intensive and thus the shortest one on record, according to a report from the American Consulate General at Vancouver. Area 2, off the British Columbia coast, the region of chief interest for fishermen here, has a quota of 25,500,000 pounds fixed by the International Halibut Commission. This quota is 1,000,000 pounds larger than last year's quota, which was exhausted in 39 days by the fishermen of British Columbia, Washington,

and Alaska. Last season, halibut fishermen in this Province, aided by a two weeks' tie-up of the halibut fleet in Seattle, Wash., landed 26,223,000 pounds of halibut, valued at $5,950,000.

Prince Rupert is the focal point for halibut operations in British Columbia, being nearer the halibut grounds than is Vancouver. However, when the price differential is sufficiently attractive, some fish are landed in Vancouver. Prices paid to the fishermen for halibut are competitive and based on market trends. Prices in British Columbia during 1947 ranged between 16 and 25½ cents per pound for mediums and between 13 and 24 cents per pound for chickens and large.



According to the Dominion Bureau of Statistics, 13,959,000 pounds of fresh and frozen halibut, having a value of $3,188,457, were shipped to the United States from Canada in 1947, as compared with exports of 4,377,000 pounds, valued at $964,194 in 1946. As only about one-twelfth of the halibut catch in Canada is from the Atlantic Coast, it is apparent that the bulk of the halibut exports to the United States from this country originated in British Columbia.

## Egypt

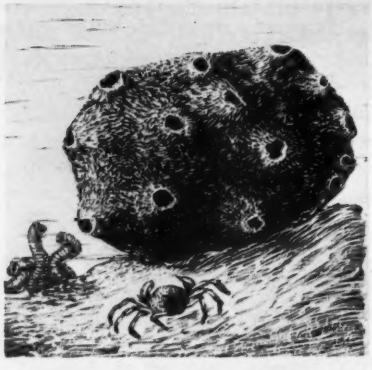
SPONGE CULTURE: Production: The sponge fishing monopoly for the Mediterranean coast of Egypt, west of Alexandria, is held by one company. There is no sponge fishing east of Alexandria because sponge production is insignificant in this area. According to the American Consulate at Alexandria, the following types of sponges were produced during a period of two months in 1947:

| Type | GRADE 1st Lbs. | 2nd Lbs. | 3rd Lbs. | 4th Lbs. | Total (Per type) Lbs. |
|---|---|---|---|---|---|
| Turkey cup - | 7,220 | 1,734 | 165 | - | 9,119 |
| Honey combs - | 13,530 | 5,361 | 2,698 | 129 | 21,718 |
| Zimocca - | 994 | 476 | 240 | - | 1,710 |
| Total - | 21,744 | 7,571 | 3,103 | 129 | 32,547 |

Exports in 1947: There were no exports of sponges because the short season in which the sponges are collected ended November 30, 1947, when the cholera epidemic was at its peak. Consequently, the agents of foreign firms were unable to enter Egypt to purchase sponges. Wartime restrictions on fishing caused Egyptian sponges to disappear from the world market for several years. Recently, American firms have begun to show interest in buying Egyptian sponges. One important American concern has sent a representative to examine the quality of local sponges, and if found satisfactory, to purchase. It is understood that other American sponge buyers are also planning to send representatives to Egypt.

Stocks on Hand: Since there were no exports of Egyptian sponges in 1947, and because there is almost no local demand, the local production figures for 1947 may be considered as the stock of Egyptian sponges on hand.

Current Prices: There have been no exports nor local sales of Egyptian sponges since the war. Current prices therefore cannot be determined. But some estimates may be made by comparison with Libyan sponges which were sold in Greece for $16.00 per pound, the quality of which corresponds approximately to the Egyptian "honey comb," which is about 10 percent more expensive. Therefore, the price of this species would be about $17.60 per pound. The Turkey cups or silks in this case should be valued at 50 percent higher and the average current price may be $25.00 per pound. There are no quotations for the zimocca brand at present.



EASTERN MEDITERRANEAN SPONGE

Present Demand: The local demand for Egyptian sponges is practically insignificant, due to the fact that these are not used for industrial purposes in Egypt. The good quality is utilized for bathing purposes, whereas the poor quality is used for automobile and lead print cleaning, etc. America is the largest consumer for fine quality sponges, the United Kingdom is the second largest.

## Germany

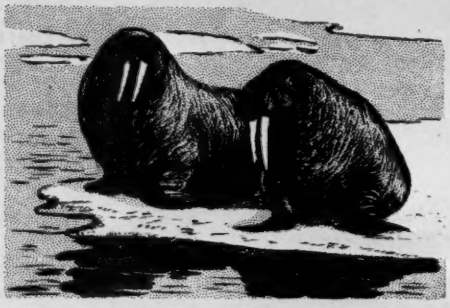
BIZONAL FISH IMPORTS: The Office of the United States Political Adviser for Germany reports that with the recent conclusion of a trade agreement between the United Kingdom and Sweden, the contracts signed up to the present time provided for the import of approximately 270,000 tons of fish for the bizonal area for the year 1948-49. This tonnage is slightly more than the estimated German catch for that period and is more than double last year's imports of 120,000 metric tons.

## Greenland

FISHERIES OF GREENLAND: It is the wealth of marine animal life which makes Greenland habitable, according to the Danish Foreign Office Journal. Ten species of whalebone whale and six different toothed whales move up and down the coast--the Greenland whale, the cachalot, the blue, humpback and Rudolphi whales, the grindhval, and the gladiator whale. The last-named is a voracious animal that preys on the smaller species of whale, the white whale and the narwhal, which tend to appear in large schools, especially in the waters of northern Greenland. These small whales are hunted by the Greenlanders with great zest; the larger whales are caught by a special whaling ship under Government direction.

There are seals everywhere, and, down to the most recent times, they used to form the absolute basis of human existence. At few places in the world is there any parallel of a single species of animal supporting and influencing the whole life of a people. The Greenland seal, the ringed seal, the bearded seal, the

harbour seal, and the bladder-nose (or hooded) seal are the five species met with in Greenland waters. Besides these true seals, large walrus colonies may be met with from Holsteinsborg on the west coast and northwards, as well as on most of the east coast north of Angmagssalik; but they have never been of importance in the life of the people. The above-mentioned seals are resident only to a slight extent in the waters around Greenland; and the increasing and systematic hunting of them in their breeding grounds has had a marked effect on the numbers which migrate to within reach of Greenland.



About 100 species of fish occur in Greenland. The charr is found in fresh water and is eagerly fished in the summer, when it migrates along the rivers to and from the lakes. The true salmon is found only in a few localities and is of slight importance. On the other hand, the small herring-like fish, the caplin (called by the Greenlanders the "angmagssat"), is of the utmost importance as human food and food for dogs. In the summer, they penetrate into the fjords in large shoals and are netted by the ton. They are dried and stored for the winter. The largest sea fish is Greenland shark, which is caught for the liver; it is abnormally large and yields oil which is extracted by a special melting process. The flounder used to be of special importance, as it was canned and exported. The fishing of it has now almost ceased since the fish is no longer found in the known grounds. Other fish caught are halibut, Greenland or blue halibut, sea scorpion, fjord cod, lump sucker, and the Norway haddock (rosefish). But excelling them all in value is the cod or "kabliau." Formerly, fishing was regarded, in Greenland, as a second-class occupation. Only those who were too incapable or infirm to hunt seals in a kayak would descend to cod fishing. Today, after 20 years of rapid development, it is the great national occupation. Year by year, the production of salt fish increases.

The future of Greenland and its people undoubtedly lies in the increasing, rational development of these fisheries during the next few years. When the canning of flounders ceased, a start was made with prawns, which extended investigations seem to indicate occur in very large numbers in certain parts of South Greenland. Crabs and scallops also occur, besides a large number of pteropods, but these are not fished.

## Iceland

FISHERIES REVIEW—FIRST QUARTER, 1948: Exports: Icelandic exports for the first quarter of 1948 were considerably above those for the corresponding period in 1947, largely on account of the record winter herring catch, and the excellent sales made by the trawlers newly acquired from Great Britain, according to the American Legation at Reykjavik.

Principal exports by country of destination were to:

| | | |
|---|---|---|
| United Kingdom - 34% | United States - 16% | Czechoslovakia - 9.5% |
| Netherlands - 9% | | France - 6% |

The only marked difference in respective importance, as compared to last year, was the fivefold increase in value of exports to the United States (owing to herring meal exports from the winter catch).

Commodities exported during the first three months of 1948 consisted chiefly of the following:

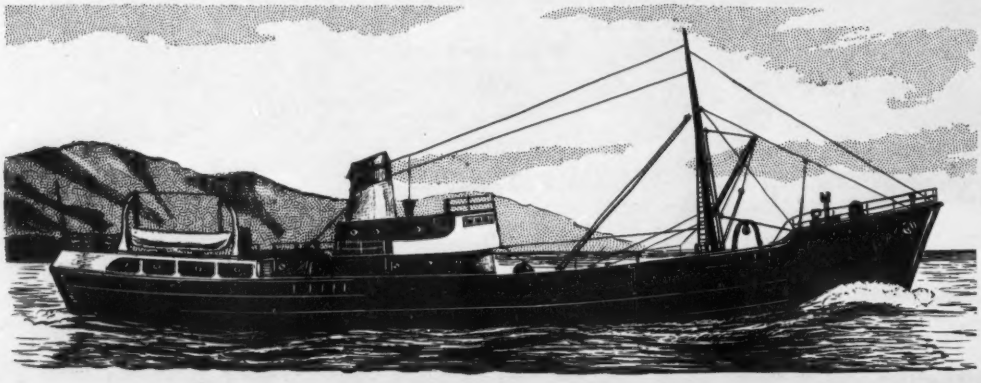
| Item | Percent | Countries |
|---|---|---|
| Fresh fish | 40 | United Kingdom |
| Herring meal | 23 | U. S., U. K., and Czechoslovakia |
| Cod-liver oil | 8.5 | U. S. and U.S.S.R. |

The fresh fish (mostly cod) was caught by the trawlers on the high seas and taken directly to the British markets. Icelandic trawlers made 98 "fish-sale" trips to Great Britain in 1948, and sold their catch for around $3.6 million. This represented a 38 percent increase over the first quarter in 1947, when only 71 trips were made for a total sale of $2.2 million. This augmentation was largely due to the recent acquisition of new trawlers from England, which have been proving extremely successful. Eighteen of these trawlers (650 tons Diesel powered) were delivered in 1947.

The cod catch of the small boats, on the other hand, which supplies the freezing plants, amounted, in the first quarter of 1948, to only one-third of that for the corresponding period of 1947. This has been caused principally by inclement weather during all of March, and the fact that a number of boats were engaged in the winter herring fisheries at the beginning of the cod season. The total "white fish" catch of these smaller craft for the first three months of 1948 was only 3,300 metric tons, as compared to 9,350 metric tons for the same period last year. The number of boats operated was only around 40, compared with 72 in 1947.

The large sales of herring meal in 1948 resulted from the record winter catch (November - February), which totaled around 140,000 metric tons, as compared to less than 1,000 tons during the winter 1946-47, and around 123,000 tons for the summer of 1947. Very little of the winter production of herring oil (which totaled some 15,200 tons) was exported, however, during the first three months of 1948, as it was being saved for later shipments under special trade agreements.

Sales of herring meal averaged around $153 per metric ton (somewhat less in sales to the U. S.), which was approximately the same price as last year, while



sales of cod liver oil were made for dollars only at prices ranging around $600 per ton.

Imports of Trawlers: In fulfillment of construction orders placed in 1945, five new trawlers were received from the United Kingdom (out of about 15 expected this year) for a total cost of around $3.7 million. The foreign exchange needed for these purchases has already been set aside, and will not, as a consequence, affect Iceland's unobligated reserves.

## Japan

PRODUCTS FOR EXPORT: The Office of International trade, Department of Commerce, has released a list of commodities currently being produced for export from Japan. Quantities are not given since volume of output is constantly changing. Requests for information concerning the availability of the listed commodities for export should be directed to the Export Bureau of Boeki Cho (The Japanese Board of Trade), Tokyo, Japan.

Frozen abalone
" albacore
" clam, baby
" cuttlefish
" frog
" octopus
" oysters
" scallop
" snapper, red
" swordfish
- - -
Agar-agar
Fish livers
Shell buttons
Bamboo tuna poles

Canned clam (baby)
" " (Hokki)
" crab meat
" mackerel, boiled
" oyster, smoked, in oil
" salmon, pink
" sardines, boiled
" " , in oil
" " , pepper
" " , tomato
" tuna in oil
" yellowtail, smoked, in oil
- - -
Gold Fish
Fishing jigs and lures
Cotton fishing twine and nets

Dried abalone
" bonito (Katsuobushi)
" cuttlefish
" oysters
" sea cucumber
" " " (lilac)
" seaweeds (Nori)
" shark fins
" shrimp
" tangle (Kombu)
- - -
Sperm head oil
Vitamin A oil
Seed oysters (available July-Sept.)
Ramie fishing net twine

* * * * *

INSURANCE SYSTEMS FOR FISHING INDUSTRY: Three types of fishing insurances are recognized in Japan, according to the Fisheries Division of the Natural Resources Section, General Headquarters of the Supreme Commander for the Allied Powers in Japan:

1. Personal insurance against casualties. 2. Boat insurance. 3. Material and catch insurances.

Because of the large risk and small profit in fishing insurance, neither insurance companies in general nor the Government will insure fishermen against casualties. However, one has granted policies to more than 250,000 fishermen throughout Japan.

Boats are generally insured by the Japanese Government, although some companies offer this type of insurance.

Although various plans for insuring material and catch have been studied, no large-scale insurances of this type have been attempted because of the risk involved.

TREATMENT OF WHALE MEAT: Of the whales caught in Japanese coastal waters, 18,701 metric tons of meat and blubber were consumed as human food in 1946. The exact figure for 1947 is not available yet, but approximately the same amount can be considered to have been obtained from coastal whaling. In addition, 2,721 metric tons of meat and blubber of whales killed in the Bonin Island area were used for human consumption in 1947.

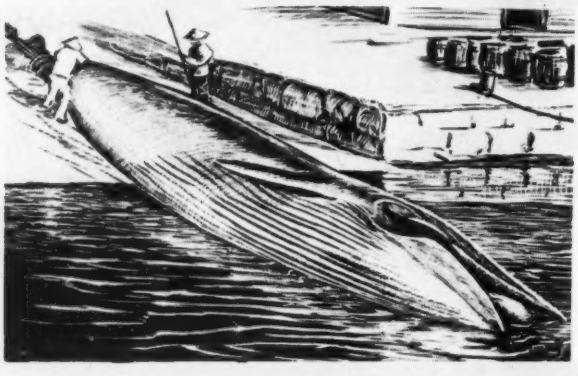
Meat and blubber are preserved in one of the following ways until they reach the consumer:

A. Frozen: The quantity is very small owing to lack of freezing facilities. Usually it is sent to inland prefectures.

B. Ice packed: The meat and blubber are washed and cooled with sea water and packed in crushed ice. This is the most common method. It is distributed in Yokohama and Tokyo.

C. Salted: This is practiced mainly on the whaling mothership, where sufficient ice is not available.

Practically all parts of the carcass are used for edible purposes in Japan, but the main parts are red meat, "Sunoko" (a portion between red meat and ventral groove), blubber, ventral groove, "Oba" (tail fin), and viscera.



SEI WHALE

Fresh or frozen whale meat is appreciated by Japanese as much as pork and beef is by Europeans and Americans. It is believed fresh or frozen whale meat would be acceptable to their taste.

In some localities of Japan, salted ventral groove is as highly appreciated as bacon is in Europe. Salted whale meat is not generally desired, but is acceptable to people engaged in coal mining and farming.

Salted meat before it is eaten is cut into correct size and then put into a pot of hot water. It is stirred until the salt is extracted from the meat. Then the meat is washed with cold water and cooked in the same manner as fresh or frozen meat.

Any part of red meat, "Sunoko," blubber, ventral groove, tail fin, and "dendo" (connective tissue of lower jaw) is salted. This is practiced, however, only when freezing facilities or ice is not available. Special care is used to select the part which contains a minimum amount of fat. It is undesirable to salt the meat in summer when the temperature is more than 80° F.

The fatty tissue is trimmed off as much as possible, but in the case of ventral grooves and tail fins, the fat is usually not trimmed.

Size of the pieces salted are as follows:

A. Red meat - one square foot with a thickness of two inches.

B. Ventral groove, blubber, and "dendo" - two feet long, five inches wide, and two inches thick.

C. Tail fin - sliced at a thickness of two inches.

To salt whale meat, it is cut into correct sizes; the raw material is washed and cooled with sea water; salt is added to approximately 10 to 15 percent of raw material; then it is left in the open air for about 20 hours. During this period, water and blood seep out, and the meat cools to 8° C. Then the final salting is done.

The Japanese do not actually inject any brine into the meat, but when the meat is preserved in a vat with salt, the salt and the water which seeps out from the meat make a brine. Salt amounts to approximately 35 percent of the weight of raw material used. Salt content of the brine caused by seepage of meat juices is 26° Baume (saturation).

Salting is divided into the open-air and the final processes.

A. Open-air process: This process removes blood and water from meat. Meat, which is cut in 1-foot squares with a thickness of two inches, on which salt is well rubbed, is piled on a grate. A board with a heavy stone is placed on the top of the last layer of meat, thereby applying pressure to the meat for some 20 hours. Quantity of salt used is from 10 to 15 percent.

B. Final process: Meat which has undergone the open-air process is then salted in a vat or concrete tank which holds about five tons. Quantity of salt used is from 25 to 35 percent, and pressure is applied by placing a weight on the top. Brine is maintained in a saturated state, always covering the surface of meat.

From 5° to 16° C. are the temperatures prevailing in the meat tanks or holds during the catching season and the voyage home. Naturally, the lowest possible temperature is desirable. When fresh material is processed and salted under ideal conditions, there is no indication of fermentation or stench enroute or during discharge of the cargo. However, the preliminary salting in the open-air process is absolutely necessary when superior salted meat is wanted. If this process is omitted, fermentation occurs. The average salt content of the meat when it is retailed is 24.2 percent.

Frozen meat can be kept in sound condition for about one year, ice-preserved meat for about one month, and salted meat for about six months.

Practically all meat is sold fresh, but as refrigeration facilities were not available for the 1946-47 Antarctic Whaling Expedition, 20,385 metric tons of salted products (including 14,666 metric tons of salted meat) were brought back and distributed to consumers in all regions of Japan.

Experiments are being made to improve the palatability and methods of preserving whale products by smoking and by using bacteria and molds. Among whale foods developed by the station are a meat spread and a "whale corned beef."

## Mexico

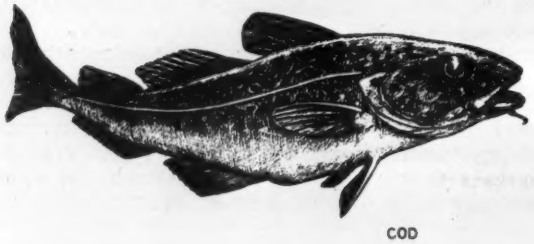
"SAFE CONDUCT" PERMITS CANCELED: It was reported on May 18 that the Ministry of Marine in Mexico authorized the Director General of Fisheries to cancel completely the so-called "safe conducts" ("pasavantes") for fishing by foreign boats.

In the past, it has been the practice of the Mexican Ministry of Marine and the Directorate General of Fisheries and Allied Industries to issue safe-conduct permits for fishing in Mexican waters, to boats which had approval of the U. S. Maritime Commission to change to Mexican registry. These safe-conduct permits were issued in order to permit the boats to fish while their papers were being processed for Mexican registry. However, there has apparently been considerable abuse of the safe-conduct fishing permits by groups who did not wish to have their boats transferred to Mexican registry but wished to fish in Mexican waters for a limited period. Normally, the safe-conduct licenses for fishing are issued for a period of 90 days and can be extended for a maximum of 6 months. In accordance with the present announcement, only those boats, the owners of which have completed the entire process of coming under Mexican registry, may now fish in accordance with Mexican law. This order is aimed directly at the shrimp fisheries in the Gulf of Mexico.

## Newfoundland

FOREIGN EXCHANGE PROBLEM IN MARKETING 1948 SALT COD PRODUCTION: On May 11, 1948, the Newfoundland Government announced that it would make dollars available to salt cod exporters in order to make possible sales to European countries in the sterling area, according to the American Consulate General at St. John's.

Newfoundland produces for export about 100,000,000 pounds of salted cod each year. At least half of this has been absorbed by European markets, and the loss of these markets would be a heavy blow to the fishing industry. Exports fell off in 1947 largely because of foreign exchange restrictions, and relatively large stocks were carried over for marketing in 1948. Newfoundland is not in a position to trade dollar for dollar with her European customers, and such trade has been made possible by the use of sterling, convertible into dollars. Before the war, when two European countries were short of sterling, Newfoundland was able to continue its exports through inclusion in Trades and Payments Agreements made between them and the United Kingdom, and received the dollars needed for its purchases. In 1947, because of abnormal postwar conditions, it was not even possible to convert sterling into dollars, and the Government of Newfoundland had to step in and pay dollars for equivalent sterling deposited in the Bank of England.



COD

In 1947-48, the Government used $5,643,000 in this manner; as of March 31, 1948, there remained $10,762,000 in the Government's Canadian dollar account at a

local bank. It is evident that the Government could not continue the assistance extended during 1947 for an indefinite number of years. The announcement dated May 11, 1948, emphasized that the arrangements made would apply only to the 1948 production, and would in no event be possible in subsequent years.

In its announcement, the Government stipulated that:

1. Sales should be made wherever possible to countries in the dollar area, minimizing the need for drawing on the Government's limited dollar reserves.
2. A portion of the dollar payments to exporters would be withheld until the Government becomes satisfied that a fair price is being paid to the fishermen.1/
3. A financial limit for such sales will be set.
4. Further modifications will be made as deemed advisable, following discussions with the Newfoundland Fisheries Board and the trade.

GENERAL FISHERIES OUTLOOK: The first quarter in 1948 was the off-season for the fisheries--Newfoundland's dominant industry. The outlook for the year appeared favorable. Exporters of frozen fillets were confident of expanding their exports to the United States, following the abrupt decline in production suffered in 1947. Thus far, the herring fishery has been poor, giving rise to some doubt that the U. S. Army order of 200,000 barrels destined for Bizonia will be entirely filled. First reports from the seal fields have been encouraging, the prospects being for a season at least as successful as in 1947.

Two important business factors which will bear watching are the degree of success attending the filling of the large 200,000-barrel herring order, destined for Bizonia, and the size of the seal catch.

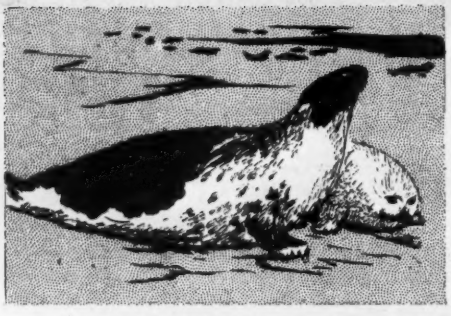
Cod Fishery Outlook: The general outlook for Newfoundland's dominant industry, the salt cod fishery, is for a season approximately as successful as the highly satisfactory 1947 season (production about 125,000,000 pounds).

During the first quarter, most of the stocks of 1947 salted cod were satisfactorily disposed of--mainly to European markets in the sterling area. Such stocks had accumulated after British foreign exchange restrictions had held up shipments to markets in the sterling area, and it was not until the Newfoundland Government intervened with its dollar holdings that the situation was at least momentarily solved. The Government has made no announcement as to whether or not it would again intervene in 1948, although such intervention is widely anticipated. Certainly, if sales are not made to markets in the sterling area, the cod fishery--and with it, Newfoundland's entire economy--would be in dire straits.

Frozen Fillets Outlook: The production of frozen fillets, which fell from over 30,000,000 pounds in 1946 to less than 15,000,000 pounds in 1947, is expected to show at least a slight increase from 1947's relatively low figure. Leading exporters appear confident of increasing sales to the United States, at the same time conceding the virtually complete loss of the war-stimulated United Kingdom market. It should not be surprising, during 1948, to find production exceeding 20,000,000 pounds, practically all destined for the United States.

Herring Fishery Outlook: Some doubt is expressed in fishery circles that the U. S. Army order of 200,000 barrels of herring for Bizonia will be filled.

1/The price paid to fishermen in 1947 is the subject of acute current dispute.



HARP SEAL

Herring are not striking in numbers comparable to recent years, and exporters are pessimistic over chances of entirely filling this important contract.

Seal Fishery Outlook: First reports from the seal fields indicate that the auxiliary vessels prosecuting the seal fishery are succeeding in obtaining a sizable catch, probably comparing favorably with last season. Success at the seal fields, in addition to putting money into circulation, always acts as a psychological tonic to business for the balance of the year.

## Nicaragua

VESSELS IN NICARAGUAN WATERS: As a reminder of a procedure that has been in effect since last October, and which applies to both the Atlantic and Pacific Coasts of Nicaragua, the following letter was sent to all shipping agents in Corinto, Nicaragua, on April 6, 1948, by the Port Commander:

> "For your information and in order that you may be so good as to communicate it to all captains of the vessels of your principals, I take the liberty of informing you that, on the high seas, when the air patrol of the FAN (Nicaraguan Air Force) appears, they must raise the flag of their nationality. This order is for all steamships navigating in territorial waters or off the coasts of Nicaragua.
>
> "The air patrol plane will circle around the vessel, giving it time to show the flag of its nationality in order to identify it and know what to expect.
>
> "Failure to comply with this dispensable (sic) requirement in territorial waters or off the coasts of Nicaragua might cause regrettable accidents which it is desired to avoid.
>
> "I request you to notify me that this has been received (and) understood so that I may communicate your decision to my superior.
>
> "Note: All steamships must display their name, letters, or identification numbers on the bow and stern."

In view of the above, it is suggested that all United States vessels planning to transit Nicaraguan waters or call at Nicaraguan ports notify their local agents in advance whenever possible in order that air force patrols may be informed.

## Norway

HERRING FISHERY, 1948: Norway's greatest herring season closed March 20 with a catch of 865,000 metric tons, presently valued at $26,157,000 compared with last season's previous high of 530,000 metric tons, valued at $16,097,000, according

to the American Embassy at Oslo. Additional supplies of herring oil may free whale oil for export and contribute to protein feeds.

Herring meal production during the winter herring fishery this year amounted to over 90,000 metric tons as compared with 50,000 tons produced up to the same time the previous year.

* * * * *

HERRING "THREADING" MACHINE: An experimental machine has been built in Norway for "threading" brisling and small herring on the small rods from which they are suspended during the smoking process prior to canning as "sardines." The machine has only been built on a laboratory scale, according to the Royal Norwegian Information Service, but it is believed it will have a capacity of 15 to 20 "skjepper"—561 to 748 pounds—of brisling per hour and will take the place of 20 to 30 women.

INSULIN FROM WHALES: Aboard Norway's newest whaling factory ship, the Thorshøvdi, launched in Denmark in mid-April, will be a modern hospital and laboratory. The Danish physician, William Sterling, and the Danish insulin specialist, Dr. H. C. Hagedorn, recently returned from three months of research in the Antarctic, have been investigating the possibility of extracting insulin from the pancreatic glands of whales. "In the whale," notes Dr. Sterling, "this gland reaches a weight of 165 pounds, while the pancreatic gland of the pig, from which insulin is normally extracted, weighs a mere 2.6 ounces." Though insulin content of the whale gland is 50 percent lower, it will nevertheless provide over 500 times more insulin than the present source as it is over 1,000 times larger. "Extraction will be fairly expensive," continued Dr. Sterling, "but money cannot be decisive when it is a matter of saving human life."

WHALING, 1947-48: With the conclusion of the 1947-48 Antarctic pelagic whaling season on March 31, Norwegian expeditions had accounted for over 50 percent of the 1,800,000 barrels of oil aboard the international fleet at that time. Production of the 10 Norwegian expeditions totaled 935,902 barrels of whale oil and 54,741 barrels of sperm oil against 903,661 and 33,657 barrels, respectively, for the 1946-47 season. The total value of this season's production is estimated at $84,500,000. Though the total output was greater, a larger number of Norwegian expeditions participated this year, and output per whale boat per working day was 23 percent below last year's figure. Equipment used consisted of 9 floating factories with 84 killer boats and 1 land station with 7 killer boats.

Poor results are attributed to bad weather and scarcity of blue whales. The Director of the Norwegian Whalers' Association notes that this scarcity represents a dangerous sign, and shows that Norway's warnings in the past have been amply justified.

One hundred thousand tons of the Antarctic production of Norwegian companies has been sold to domestic fat hardening factories for about $440 per ton.

## Peru

FISHERIES RESOLUTIONS: From December 26, 1947 to January 5, 1948, the professional agricultural technicians of Peru held a national conference at Lima to discuss the country's agricultural problems, and desirable policies with regard thereto, according to a report from the American Embassy at Lima. The conference was sponsored by the Asociación Peruana de Ingenieros Agrónomos (Peruvian Association of Agricultural Technicians).

The views of the group on agricultural development were expressed in 79 resolutions. A translation of those resolutions applying to the fisheries of Peru appear below.

ICTHYOLOGICAL WEALTH

43. To recommend development of systematic studies of Peruvian maritime resources, establishing the necessary protection and control of the icthyological wealth of our seas, islands, and coasts.

44. To recommend increased exploitation of our maritime resources for the improvement of human and animal nutrition and for the production of fertilizers.

45. To request that existing measures be put into effect to prohibit fishing with dynamite, since this practice is highly damaging to the production of guano, to the biological equilibrium of the ocean, and to the fishing industry.

## Poland

EXPORTS OF COD: The Polish Central Fish Organization has recently closed a contract with the Soviet Zone of Germany for the delivery of 10,000 metric tons of cod during 1948 and the first quarter of 1949, according to a report published April 19. This Organization exported 112 metric tons of cod to Germany; 185 metric tons of cod to Austria; 57 metric tons of cod fillets, 30 metric tons of bream, and 10 metric tons of perch to Czechoslovakia; and 18.3 metric tons of frozen salmon to Great Britain.

A representative of the Organization will visit Hungary and Rumania to effect contracts for the export of fish to those countries.

## Union of South Africa

FISH OILS--ANNUAL REPORT: Introduction: Valuable oils of a high vitamin potency are now being produced from the liver and visceral oils of certain South African fish, both in Cape Town and at Gansbaai on the south coast, east of Cape Town, according to the American Consulate General at Cape Town. Certain companies produce oil from pilchards which abound around the coast of southern Africa. The vaalhai or soupfin shark has proved to be a very valuable source of liver oil of a high vitamin A potency; the inshore fishing industry is chiefly engaged in shark fishing for production of vitamin oils.

OUTPUT AND VALUE OF INDUSTRY: The annual output of fish liver oil is estimated to be 160,000 imperial gallons and that of fish body oils, 250,000 imperial gallons. The value of the fish and vitamin oil industry is estimated to be approximately $6,000,000.

FISH OILS: Production: A number of large new plants have been purchased in the United States and installed along the west coast of the Union of South Africa and a very considerable increase in the production of fish oil is expected to take place during 1949. The estimated capacity which will be available in 1949 is 100 long tons of fish per hour, and with the fairly long fishing season, this is expected to produce at least 10,000 long tons of fish oil (and 15,000 short tons of fish meal) during 1949.

SOUPFIN SHARK

Distribution: Up to the present, there have been no facilities in the Union for the processing of crude fish oils and the small production achieved so far has been largely exported to Australia at prices varying between $1.40 and $1.70 per imperial gallon. A small quantity of the oil production has been consumed by the leather processing industries. With the advent of the new refinery, the South African fish oil producers are assured of a new local outlet for the major portion of their production.

VITAMIN A OILS: Production: The production of vitamin A oils in the Union of South Africa, which commenced about 1941, continues to expand slowly as the companies develop their fleets and exploit new fields. The estimated production for 1948 of vitamin A is in the neighborhood of 8,000,000 M.I.U. (Million International Units) about half of which are expected to be derived from soupfin shark and the balance from the livers of various types of edible fish.

Distribution: During the war years, the total output of crude vitamin A oils was sold by individual companies to the British Ministry of Food. Immediately after the war, however, all the various producers of vitamin A in South Africa came together to form jointly a new company which was to undertake the production of vitamin A concentrate in South Africa from the supplies of crude low potency vitamin A oil. This new company is about to go into production. Since January 1948, all producers of vitamin A oil in South Africa have sold their production to this new company for concentration purposes. This state of affairs is expected to continue, since the producers are all shareholders in the concentrating company.

Markets: The entire output of vitamin A concentrate and feed oils will be sold in various parts of the world from 1949 onwards, but for the year 1948, practically the whole production has already been sold on contract to the British Ministry of Food. The prices paid by the concentrators for the raw oil are in line with prevailing world prices and likewise, the price asked for the concentrate will be in accordance with American prices.

FINANCIAL INVESTMENT: During the last year, considerable new investment has occurred in the South African fishing industry. This new investment has chiefly taken the form of the expansion of capital by a large number of existing concerns.

The estimated increase in the capital investment in the fishing industry during 1948 is placed at approximately $8,000,000, and by far the largest proportion of this amount has been invested in the erection of fish meal and oil plants along the west coast of South Africa. A certain amount of investment in fishing fleets has taken place to supply these fish meal and oil plants.

A new large trawling company has commenced operations from Cape Town with an initial fleet of eight second-hand trawlers purchased in Great Britain. At Dido Valley, Simonstown, a large modern vitamin A concentrating unit and fish oil refining plant has been completed and is about to go into operation.

The Fisheries Development Corporation, a government-sponsored organization, continues to invest appreciable sums of money in small fishing harbors at various points along both the east and west coasts of South Africa.

LABOR: It is computed that there are about 8,000 persons engaged as fishermen, either full or part time. In the byproducts side, there are about 4,000 persons. The majority of the fishermen are non-Europeans.

In the development of the industry, due consideration has been given to the remuneration of the fishermen and workers in the fishing industry generally. The prosperity of the fishing companies and the increased tempo of work in this industry has naturally benefited fishermen and other associated workers.

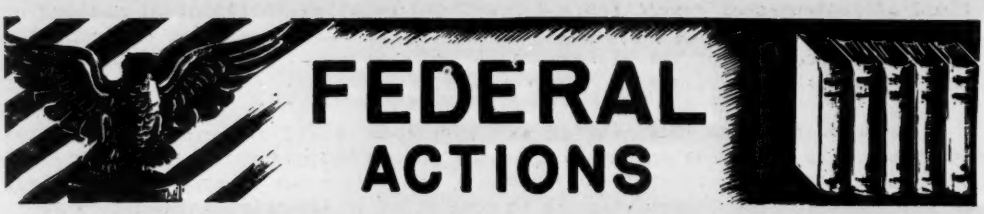
OUTLOOK: The year 1947 was a year of considerable development in the South African fishing industry, development which has carried over into the year 1948 and the results of which are expected to appear on the world market in 1949, when it is anticipated that there will be limited quantities of crude fish oil for export and considerable quantities of refined and processed fish oil, vitamin A concentrates and low potency vitamin A feed oils.

CONCLUSION: The fish show no sign of depletion among any of the various species taken and the reception of the industry's products by various consumers in different parts of the world outside the African continent is considered to have been very encouraging. The executives of the industry have not been slow to make use of the experience of Americans and Canadians, to employ plant, boats, and equipment found satisfactory in these areas, and also to employ an adequate number of trained chemists and biologists to assist in the further expansion and control of the industry.

## Venezuela

FISH PRODUCTION, 1947: The Ministry of Agriculture has announced the 1947 fish catch in Venezuela as being 89,896,235 pounds, according to the American Embassy in Caracas. The catch in 1946 was 80,319,393 pounds.

The increase of 11 percent in the 1947 catch is attributed by the Minister to easier credits to fishermen, sale at cost of fishing equipment, improving transport and industrialization, and to training fishermen in the art of catching more fish.




## Food and Drug Administration

USE OF NAME "JACK MACKEREL" FOR "HORSE MACKEREL": No action will be instituted against interstate shipments of canned Trachurus symmetricus--known on the Pacific Coast as "horse mackerel," "jack mackerel," "Spanish mackerel," and "saurel"--by the Food and Drug Administration if the can is labeled "jack mackerel" and no representations are made that it is California mackerel (Pneumatophorus diego).

A letter from the Assistant Commissioner of Food and Drugs to the Chairman of a Committee of the California Fish Canners Association, which reviews the expressions of opinion from two Fish and Wildlife Service biologists, contains the following declaration:

> "In the light of the views expressed by these scientific authorities it will not be our purpose at this time to institute action under the Federal Food, Drug, and Cosmetic Act against interstate shipments of canned Trachurus symmetricus labeled as 'jack mackerel' provided that no representations are made on the label or elsewhere which would lead consumers to believe that the product is California mackerel (Pneumatophorus diego) or some other product which it is not. Your attention is called to the fact that in addition to the provision of the Act prohibiting label statements which are false or misleading, another provision classes a food as misbranded if it is sold under the name of another food. Thus any written or oral representations in connection with the sale of the product, in invoicing or elsewhere, implying that this fish is 'California mackerel' or 'Pacific mackerel' or any other fish than Trachurus symmetricus would constitute misbranding of the product.
>
> "In order that the label itself may not confuse or mislead, we believe the word 'jack' should be prominently printed in the same size, color, and style of letters as the word 'mackerel' which it modifies. We also second the suggestion made by Dr. Hildebrand that to exclude any doubt as to the origin of the product the scientific name Trachurus symmetricus be included on the label."

## Department of State

UNITED NATIONS MARITIME CONFERENCE: The United Nations Maritime Conference which was convened by the Economic and Social Council of the United Nations met at Geneva, Switzerland, February 19-March 6, 1948, to consider the establishment of an intergovernmental maritime organization, according to the Department of State. The opening of the Conference was attended by representatives of 32 countries.

On the basis of its deliberations, the Conference prepared and opened for signature a Convention on the Intergovernmental Maritime Consultative Organization (IMCO). Part I, Article 1 of the Convention states that one of the purposes of the Organization is to provide machinery for cooperation among Governments in the

field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade, and to encourage the general adoption of the highest practicable standards in matters concerning maritime safety and efficiency of navigation.

Membership in the Organization is to be open to all members of the United Nations and to countries not members of the United Nations which were invited to the Conference. Other countries may become members upon the approval by two-thirds of the members. The Organization is to consist of an Assembly, a Council, a Maritime Safety Committee, and such other organs as are considered necessary. The Assembly is to meet once every two years, the Council will convene when necessary, and the Maritime Safety Committee will meet once a year. After affecting agreement with the United Nations, the Organization will become the Specialized Agency in the field of shipping. The Convention is to come into force when 21 countries, 7 of which must have not less than 1,000,000 gross tons of shipping each, have become parties to the Convention.

A Preparatory Committee of the IMCO was established to function at Lake Success until the coming into force of the Convention.

The international safety regulations under which fishing vessels are operating and the transporting of fishery products by coastwise steamers from Canada and Newfoundland come under the jurisdiction of the IMCO.

FISHERY MARKET NEWS SERVICE
OFFICES

| Location | In Charge | Telephone |
|---|---|---|
| Washington 25, D. C., Rm. 3350, Interior Bldg. | W. H. Dumont, Chief | REpublic 1820 Ext. 4843 |
| Boston 10, Mass., Commonwealth Pier, Rm. 10 | B. E. Lindgren, Fishery Marketing Specialist | LIberty 2-1513 |
| New York 7, N. Y., 155 John St., Rm. 504 | H. M. Bearse, Fishery Marketing Specialist | HEckman 3-4382 |
| New Orleans 16, La., 1100 Decatur St. | S. C. Denham, Fishery Marketing Specialist | MAgnolia 1674 |
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| Seattle 1, Wash., 421 Bell St. Terminal | E. C. Hinsdale, Fishery Marketing Specialist | MAin 0740 |
| San Pedro, Calif., P. O. Bldg., Rm. 2 | C. B. Tendick, Fishery Marketing Specialist | TErminal 2-5355 |

# FOR THE NATION

## EACH FISHERMAN

PRODUCES ANNUALLY
47,000
POUNDS OF FOOD

## EACH FARMER

PRODUCES ANNUALLY
34,500
POUNDS OF FOOD

## THE FEDERAL GOVERNMENT

SPENDS ANNUALLY

FOR EACH FISHERMAN
$21.07

FOR EACH FARMER
$98.88

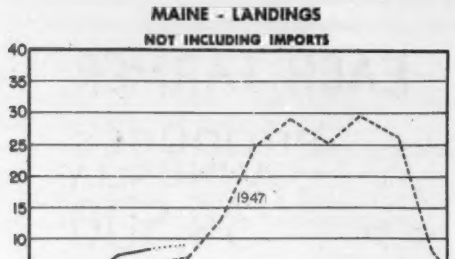
FOR EACH TON OF FISHERY PRODUCTS
90¢

FOR EACH TON OF FARM PRODUCTS
$5.73

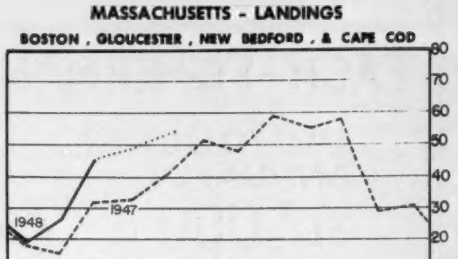
# LANDINGS AND RECEIPTS

In Millions of Pounds

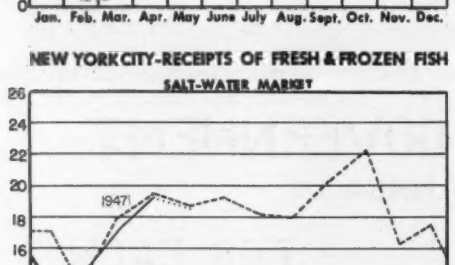
MAINE - LANDINGS
NOT INCLUDING IMPORTS



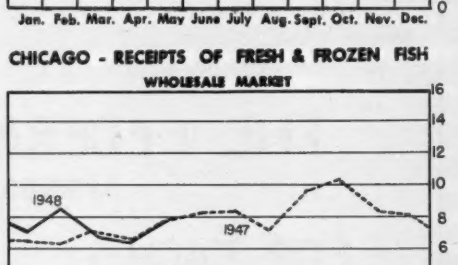

MASSACHUSETTS - LANDINGS
BOSTON , GLOUCESTER , NEW BEDFORD , & CAPE COD



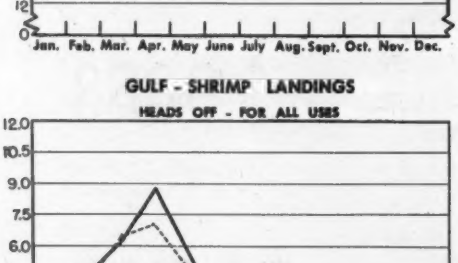

NEW YORK CITY-RECEIPTS OF FRESH & FROZEN FISH
SALT-WATER MARKET



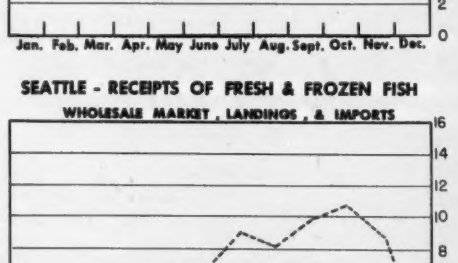

CHICAGO - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET




GULF - SHRIMP LANDINGS
HEADS OFF - FOR ALL USES

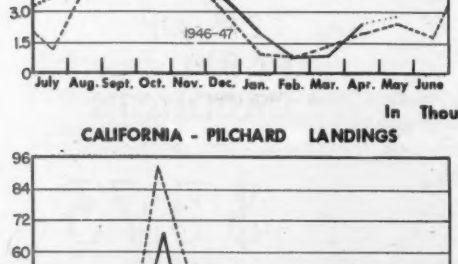



SEATTLE - RECEIPTS OF FRESH & FROZEN FISH
WHOLESALE MARKET , LANDINGS , & IMPORTS

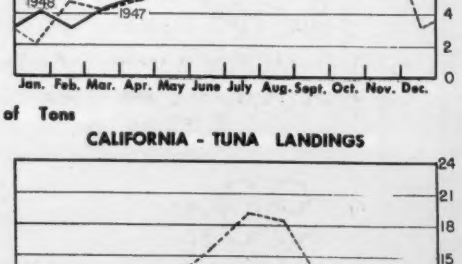



In Thousands of Tons

CALIFORNIA - PILCHARD LANDINGS




CALIFORNIA - TUNA LANDINGS

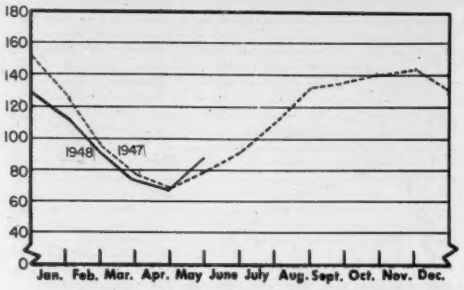



····· ESTIMATED

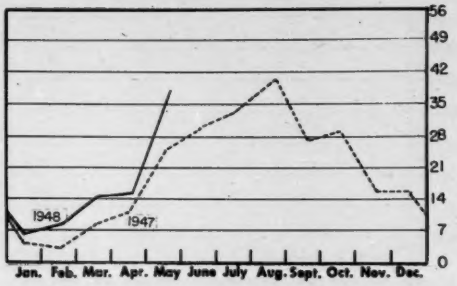
# COLD STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS

In Millions of Pounds

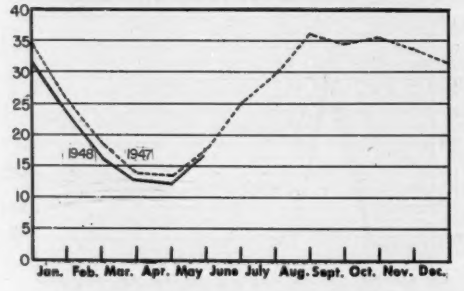
U.S. & ALASKA - HOLDINGS OF FROZEN FISH



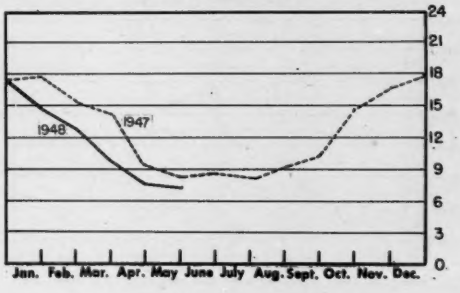

U.S. & ALASKA - FREEZINGS



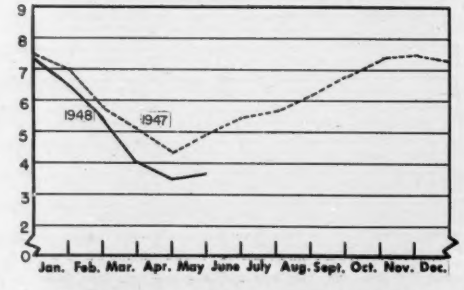

NEW ENGLAND - HOLDINGS OF FROZEN FISH



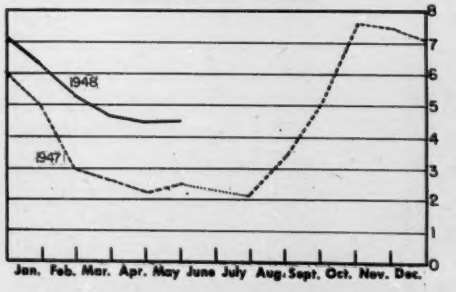

NEW YORK CITY - HOLDINGS OF FROZEN FISH



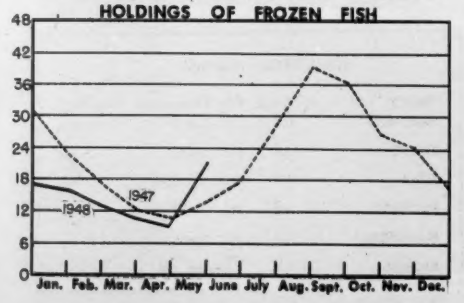

CHICAGO - HOLDINGS OF FROZEN FISH



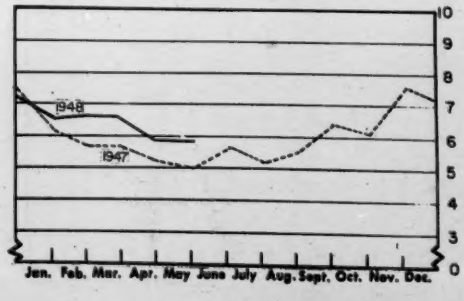

GULF - HOLDINGS OF FROZEN FISH




WASHINGTON, OREGON, AND ALASKA - HOLDINGS OF FROZEN FISH



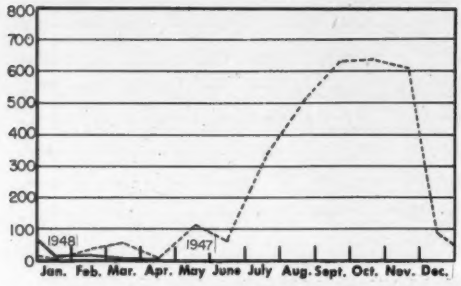

CALIFORNIA - HOLDINGS OF FROZEN FISH



# CANNED FISHERY PRODUCTS

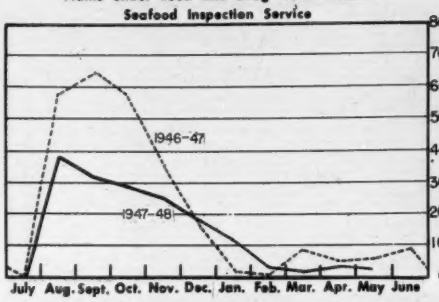
In Thousands of Standard Cases

MAINE - SARDINES, ESTIMATED PACK

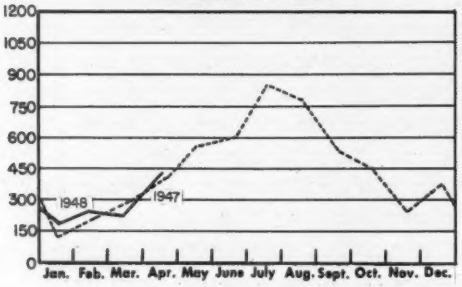



UNITED STATES - SHRIMP

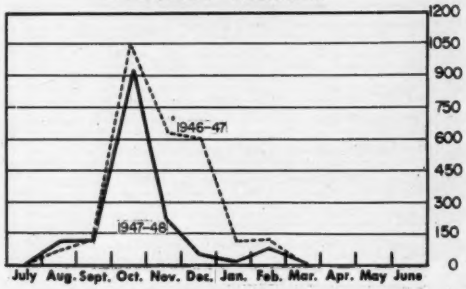
Plants under Food and Drug Administration Seafood Inspection Service



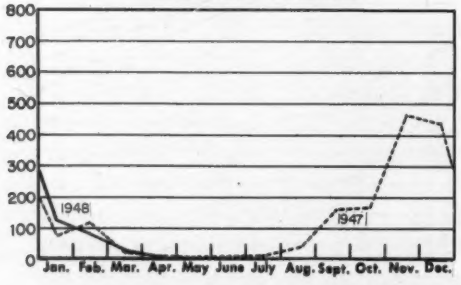

CALIFORNIA - TUNA



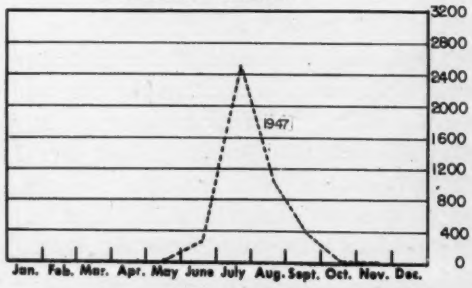

CALIFORNIA - PILCHARDS



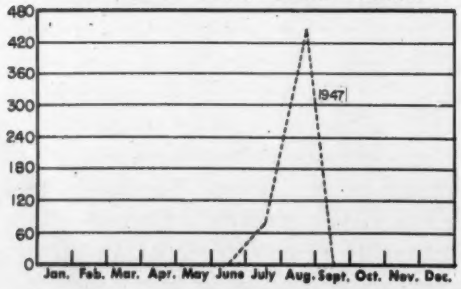

CALIFORNIA - MACKEREL




ALASKA - SALMON




WASHINGTON - PUGET SOUND SALMON

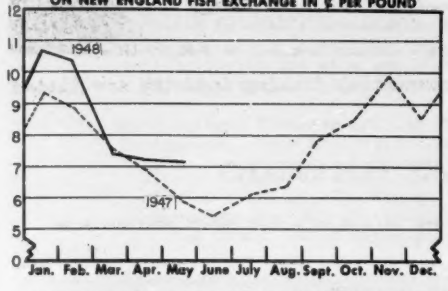



STANDARD CASES

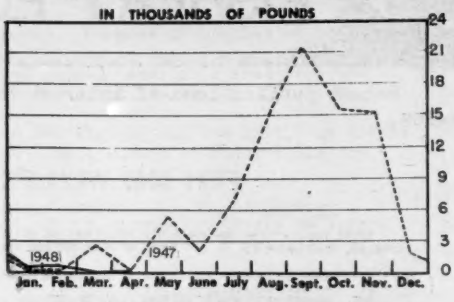
| Variety | No. Cans | Can Designation | Net. Wgt. |
|---|---|---|---|
| SARDINES | 100 | 1/4 drawn | 3 1/4 oz. |
| SHRIMP | 48 | No.1 picnic | 7 oz. |
| TUNA | 48 | No. 1/2 tuna | 7 oz. |
| PILCHARDS | 48 | No. 1 oval | 15 oz. |
| MACKEREL | 48 | No. 300 | 15 oz. |
| SALMON | 48 | 1.pound tall | 16 oz. |

# PRICES, IMPORTS and BY-PRODUCTS

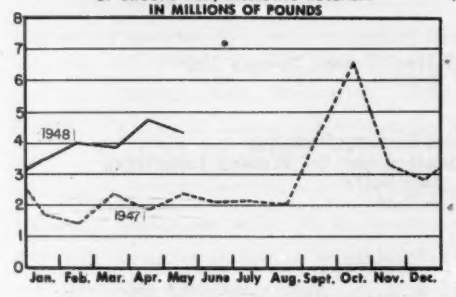
BOSTON - WEIGHTED AVERAGE PRICE
ON NEW ENGLAND FISH EXCHANGE IN ¢ PER POUND



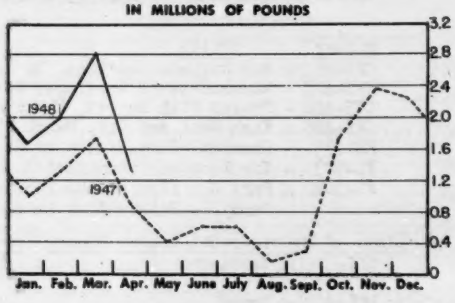

MAINE - IMPORTS OF SEA HERRING
IN THOUSANDS OF POUNDS



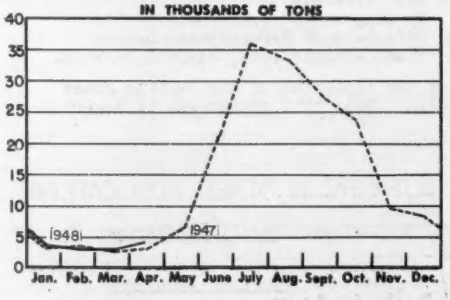

U.S. - IMPORTS OF FRESH & FROZEN FILLETS
OF GROUND FISH, INCLUDING ROSEFISH:-
IN MILLIONS OF POUNDS



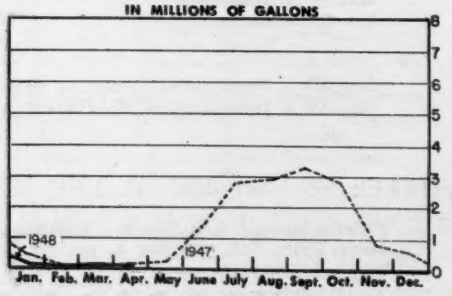

U.S. - IMPORTS OF SHRIMP FROM MEXICO
IN MILLIONS OF POUNDS

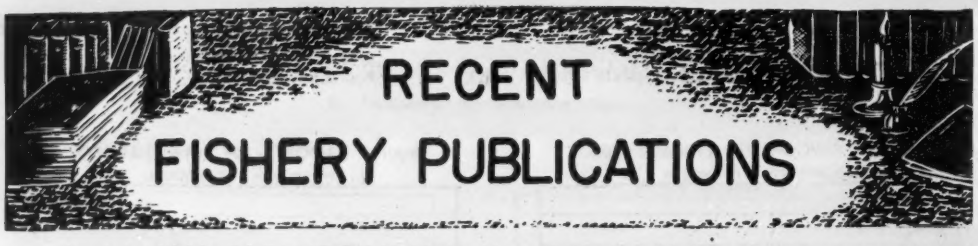



U.S. & ALASKA - PRODUCTION OF FISH MEAL
IN THOUSANDS OF TONS




U.S. & ALASKA - PRODUCTION OF FISH OIL
IN MILLIONS OF GALLONS






Recent publications of interest to the commercial fishing industry are listed below.

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, FISH AND WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLETS.
MDL - MARKET DEVELOPMENT SECTION LISTS OF DEALERS, LOCKER PLANTS, ASSOCIATIONS, ETC.
SL - STATISTICAL SECTION LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

| Number | Title |
|---|---|
| CFS-402 | New England Landings, By Gear and Area, Annual Summary 1946 |
| CFS-403 | Massachusetts Landings, November 1947 |
| CFS-404 | Frozen Fish Report, May 1948 |
| CFS-405 | Fish Meal and Oil, March 1948 |
| FL-295 | Chemical Composition of Some Canned Fishery Products |
| FL-303 | The Economic Cooperation Administration and the Fishery Industries |
| FL-304 | Part I - Fish of the Persian and Oman Gulfs<br>Part II- Edible Fish in the Persian Gulf |

Lists of Refrigerated Locker Plants (Revised):

| | |
|---|---|
| MDL-3 - Tennessee | MDL-29 - Virginia |
| MDL-10 - Pennsylvania | MDL-35 - Minnesota |
| MDL-12 - Texas | MDL-43 - South Carolina |
| MDL-19 - Washington | MDL-45 - Utah |
| MDL-25 - Wisconsin | MDL-46 - West Virginia |
| MDL-28 - Vermont | MDL-47 - Wyoming |
| | MDL-51 - Officials of Refrigerated Locker Plant Associations, State & National |

Sep. 203 - Coordinated Plans for Management of the Fisheries of the Pacific Coast
Sep. 204 - Technological Studies of the Starfish - Part IV - Thiaminase in Starfish

## ARTICLES BY FISH AND WILDLIFE SERVICE AUTHORS IN OTHER PUBLICATIONS

*"Refrigerated Tuna Carrier Operations," by C. B. Carlson. Pacific Fisherman, March 1948, Vol. 46, No. 4, pp. 35, 37.

*"Quality Control of Freezership Tuna," by C. B. Carlson. Pacific Fisherman, April 1948, Vol. 46, No. 5, pp. 47, 49.

(The above are condensations in two parts of initial reports prepared by author from his technical observations aboard the Pacific Explorer in Costa Rican waters in 1947.)

*"Problems of Preparing Frozen Packaged Fish," by J. M. Lemon. Frozen Food Industry and Locker Plant Journal, May 1948, Vol. 10, No. 10, pp. 18, 21.

*Copies of these articles not available from U. S. Fish and Wildlife Service.

# MISCELLANEOUS PUBLICATIONS

THE FOLLOWING PUBLICATIONS MAY BE OBTAINED, IN MOST INSTANCES, FROM THE AGENCIES ISSUING THEM.

Money-Saving Main Dishes, a cookbook, recently issued by the Office for Food and Feed Conservation, U. S. Department of Agriculture, contains five full pages of fish recipes. The booklet contains 150 tested recipes especially prepared to enable homemakers to save money. Purpose of booklet is to show every homemaker, dietitian, and nutritionist how to keep down food costs by thrifty buying and wise use of economical foods. Available free from the U. S. Department of Agriculture, Food Conservation, Washington 25, D. C.

"The Blackback Flounder and Its Fishery in New England and New York," by Alfred Perlmutter. Yale University, New Haven, Conn., Museum of Natural History, Bingham Oceanographic Laboratory, Bulletin, Vol. 11, Art. 2.

"Black-Fish Industry, St. Vincent, B. W. I.," article, p. 36, in Foreign Commerce Weekly, May 29, 1948, Vol. xxxi, No. 9, issued by Office of International Trade, Department of Commerce, Washington 25, D. C. Single copy 20¢.

The Canned Food Reference Manual. American Can Company, 3rd ed., 638 p., illus.

"Farm Fishponds for Food and Good Land Use." Farmers' Bulletin 1983. U. S. Dept. of Agriculture, Washington, 1947, 29 p., illus.

Fisheries Mission. Agreement Between the United States of America and Mexico, amending and extending the agreement ... entered into force October 22, 1946. U. S. Dept. of State, Publication 2886, Treaties and Other International Acts Series, 1624, Washington, 1947, 3 p.

A List of Common and Scientific Names of the Better Known Fishes of the United States and Canada. American Fisheries Society, 1948, 45 p., Printed. Report of the Committee on Common and Scientific Names of Fishes, Presented at the Seventy-Seventh Annual Meeting, Denver, Colorado, September 10-12, 1947. Twenty-five cents each, remittance payable to the American Fisheries Society, addressed to Dr. W. C. Beckman, Librarian, Museums Annex, Ann Arbor, Michigan.

A Practical Method of Predicting the Effects of Common Acids and Alkalies on the Survival of Fish, by Robert E. Stiemke and W. Eckenfelder. North Carolina University, Raleigh, N. C., State College of Agriculture and Engineering, Dept. of Engineering Research, Bulletin No. 33.

"Soviet Whaling: Importance Mounts and Scope is Broadened," article, p. 6, in Foreign Commerce Weekly, June 5, 1948, Vol. xxxi, No. 10, Office of International Trade, Department of Commerce, Washington 25, D. C. Single copy 20¢.

"Studies on the Marine Resources of Southern New England, VI," by Emmeline Moore. Yale University, New Haven, Conn. Peabody Museum of Natural History, Bingham Oceanographic Laboratory, Bulletin, Vol. 11, Art. 3. The sand flounder, Lophopsetta aquosa (Mitchill); a general study of the species with special emphasis on age determination by means of scales and otoliths.

A Study of Oyster Strike on the Seaside of Virginia, by John G. Mackin. Virginia Fisheries Laboratory of the College of William and Mary and Commission of Fisheries of Virginia, Richmond, Virginia, 1946, 18 p., illus.

**Processing -- Miscellaneous Service Division**

**Illustrator--Gustaf T. Sundstrom** **Compositors -- Jean Zalevsky and Norma D. Loeffel**

## FREEZING FISH AT SEA

"Freezing Fish at Sea," by J. M. Lemon and C. B. Carlson, Fishery Leaflet 278, describes the most recent progress in freezing fish. In addition, it traces the development of equipment and methods of freezing fish on fishing vessels. The 11-page leaflet also contains diagrams and illustrations.



Fishery Leaflet 278 is available free on request from the United States Fish and Wildlife Service, Washington 25, D. C.

University of Michigan General Library,
Ann Arbor,
Michigan.

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